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CRUDE OIL SUPPLY AND DEMAND PROSPECTS IN AFRICA

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A. INTRODUCTION

The development of the hydrocarbon resources of Africa did not become significant until the early 50s. The search for oil in the continent can be traced to the need of the major oil producing companies to diversify their supply base in the face of forseen decline of reserves in their home countries as well as the growing political volatility of the Middle East, the only other known major producing area. Old colonies tended to become the first areas of exploration and exploitation for companies originating from associated colonial powers.

B. CRUDE OIL RESERVE PROFILE

For the decades that followed, significant oil discoveries were made in North and West Africa. Africa's estimated proven reserves rose from 12.4 billion barrels in 1962 to 68.3 million barrels in 1974, with only four countries namely Algeria, Libya, Nigeria and Angola accounting for the bulk of the discoveries. These four countries account for 87% of Africa's total oil reserves from 1975 to 1985. Simultaneously with Africa becoming a prominent oil producing region was an increasing demand from host countries, very much in line with events in other oil producing regions, to exercise direct control in the exploitation of the resource.

Host countries either nationalised or acquired controlling interest in the operations of the international oil companies. Available data on development of African oil reserves show that the rate of discovery slowed down considerably from 1975 till 1981 (see Table 1). This decline partly reflected the reaction of the international oil companies to the forementioned changing economic and political climate in the major producing countries in Africa, most of who were members of OPEC. Much as it is true that there was a world wide economic recession which curtailed exploration investments between 1980-84, the distribution of the reduction tends to support that the notion that reduced exploration investments in Africa was motivated by reasons other than economic alone. Between 1981 and 1984, the number of active rigs fell by 209 out of which Africa shed 105 or about 50%. The bulk of the remaining came from Latin/South America (see Table 3). This observation is further supported by the fact that a large percentage of African oil reserves was in the low cost production zone (see Table 4). The marginal gains in the reserves position after 1981 resulted from discoveries in many of the non-OPEC African countries such as Cameroon, Republic of Congo, Egypt,Cote d'Ivoire et. al. Proven oil reserves in Africa today stand at about 57 billion barrels (See Table 5).

C. PRODUCTION

Oil production rose steadily from a level of 4.99 mbd in 1975 and peaked at 6.63 mbd in 1979, or 10.2% of world production. This peak was followed by a period of progressive decline in production rate and technical production capacity. By 1985, total production rate stood at 4.88 mbd. Provided the present reserve position is maintained and there is no geopolitical disturbance that forces a total disruption in production, Africa can maintain its 9.1% (average over 1975-85) share of world wide oil production (excluding NGLs),which is expected to remain in the neighbourhood of 55 mbd till the end of this decade. Table 2 shows the relative contribution to total oil production from OPEC and non-OPEC African Countries. Non-OPEC production has shown a gain of almost 3% over the last 3 years. African producers can raise their production by more than 30% in the event of a short term requirement to raise production levels.

D. DEMAND FOR PETROLEUM PRODUCTS

Most African Countries have a weak industrial base and their economies are largely agrarian.

Crude oil consumption has invariably been in the most elementary utilisation i.e. provision of automotive fuels, fuels for lighting and power generation. Petroleum products consumption rose from about 1.05 mbd of crude oil equivalent to 1.57 mbd in 1981. The present debt problem facing most of the countries has necessitated structural adjustment measures which have dampened already low levels of demand for petroleum. The outcome of a recently concluded petroleum market survey in the West and South West African Sub-region, showed that petroleum consumption in that part of the continent will remain at the 1985 level of 0.6 mbd of crude oil until the end of the decade. About 45% of this figure represents Nigeria's consumption. African consumption of crude oil is expected to remain at a level of 1.7 mbd for the forseeable future.

E. EXPORTS OF PETROLEUM

The participation of Africa in international oil trade has followed on one hand the continent's production profile but most recently it has been largely determined by the buying and consumption patterns of the consuming countries. Netcrude oil export (excluding NGLs) from Africa peaked at 5.3mbd in 1979 and currently stands at about 3.2 mbd. Crude oil export is not expected to exceed 3.5 mbd by the end of this decade. The bulk of the exports have been destined to the OECD countries .

F. PROSPECTS FOR 1990 - 2000

The present oil price and demand perspective as well as existing surplus production capacity continue to dampen the search for more oil reserves. In the case of Africa, any significant change in level of reserves will require huge investments in exploration. Most producing countries can hardly afford such capital outlay. Efforts are therefore directed at maintaining current reserves and some level of spare production capacity. Furthermore, comprehensive seismic surveys outside the already known successful OPEC areas are limited to only two basins, the Cabinda and the MSGB (Mauritanian, Senegal, Gambia and Bissau) basins. Of the two, the Cabinda basin's potential is already fairly well known. Very little is being done to open up the hinterland and the deep offshore belt. With this situation, oil reserves are not expected to grow substantially over the next decade. If the projected changes in oil demand pattern in the early 90s materialise, and African producers continue to maintain their spare production capacity, crude oil production can reach the 1977 level of about 6.3 mbd.

Net exports will also rise to about 4 mbd, given the projected internal demand of about 2.3 mbd by the year 2,000. The potential of Africa with respect to gas is also expected to come into play during this decade.

G. CONCLUSIONS

The development of African Oil potential beyond the currently known limits will rely heavily on participation of foreign capital as well as foreign technology. Whether such participation will be forthcoming will depend on the percieved oil demand profile in the 90s as well as the geopolitical and reserves development in the other oil producing regions of the world. If the main African producers are able to maintain their spare production capacity, existing reserves will allow the African countries to sustain a production rate of about 6 mbd and a net export level of 4 mbd through by the year 2,000. Even so, available reserves will at this production level last another 25 years.

TABLE 1

AFRICAN PETROLEUM PROFILE (1975-1985)

	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985
Reserve (billion Barrels)	65.1	60.6	59.2	57.9	57.9	57.1	55.1	56.2	57.8	56.9	55.5
Production (MBD)	4.99	5.85	6.26	6.07	6.62	6.12	4.70	4.52	4.40	4.74	4.88
Refining Capacity (MBD)	1.27	1.38	1.51	1.73	2.00	2.06	2.04	2.35	2.34	2.54	2.55
Refinery Throughput (MBD)	1.01	1.06	1.17	1.29	1.36	1.46	1.53	1.74	1.92	1.98	2.02
Consumption (MBD)	1.05	1.16	1.21	1.29	1.36	1.49	1.57	1.65	1.67	1.67	1.72
Export (MBD) (Calculated)	3.94	4.69	5.05	4.78	5.26	4.63	3.13	2.87	2.73	3.07	3.16
Natural Gas Production (MTOE)	1.27	13.7	12.8	18.6	32.3	26.8	29.1	30.5	28.1	39.5	42.1
Natural Gas Consumption (MTOE)	4.3	5.1	6.9	11.1	16.5	17.5	19.9	18.0	17.6	24.3	25.9

SOURCE:
1. OIL AND GAS JOURNAL
2. INTERNATIONAL PETROLEUM ENCYCLOPEDIA
3. PETROLEUM ECONOMIST
4. ENERGY TREND.

TABLE 2. AFRICA'S OIL PRODUCTION (1985-87) MBD

COUNTRY	1985	1986	1987 JAN - MAY
OPEC AFRICA			
ALGERIA	672.4	673.9	632.20
GABON	171.7	163.2	151.10
LIBYA	1,023.7	1,308.0	948.5
NIGERIA	1,498.9	1,453.3	1,168.9
SUB-TOTAL	3,366.70	3,603.4	2,900.70
NON-OPEC AFRICA			
EGYPT	891.50	810.3	879.0
ANGOLA	229.50	277.30	305.0
TUNISIA	117.63	104.00	100.00
OTHERS	274.00	264.00	264.00
SUB-TOTAL	1,512.63	1,455.60	1,548.00
GRAND-TOTAL	4,879.33	5,059.00	4,448.70

SOURCE: 1. OPEC ENERGY AND OIL STATISTICS JUNE, 1982

2. NNPC INTERNAL DATA.

TABLE 3

RIGS ACTIVE

REGION	1978	1981	1982	1983	1984	1985	1986
MIDDLE EAST	165	114	154	135	148	138	113
ASIA	186	249	265	253	248	248	220
AFRICA	197	240	247	161	135	158	111
WEST EUROPE	155	266	253	185	257	262	176
LATIN AMERICA	402	536	499	425	443	448	335
AUSTRALASIA	13	41	28	36	40	39	14
TOTAL	1,118	1,446	1,446	1,194	1,271	1,293	969
NORTH AMERICA	2,460	4,797	3,120	2,933	2,879	2,229	916
WORLD EXCL. CPE	3,578	6,243	4,566	4,127	4,150	3,522	1,885

SOURCE: OIL AND ENERGY TRENDS.

TABLE 4

DISTRIBUTION OF TYPES OF WORLD OIL RESOURCES BASED ON THE COST OF PRODUCTION

(Gigatons Oil Equivalent)

1983 $/BBL.	0-4	4-12	12-20	20-30	>30	TOTAL
Proven Reserves 1/1/83	70	20	5	-	-	95
Future Discoveries & Increased Discoveries	20	65	65	40	15	205
Total Resources	90	85	70	40	15	300

GEOGRAPHICAL DISTRBUTION OF WORLD OIL RESOURCES BASED ON THE COST OF PRODUCTION

(Gigatons Oil Equivalent)

1983 $/BBL	0-4	4-12	12-20	20-30	>30	TOTAL
Middle East	70	25	15	5	-	115
Africa	10	10	5	5	5	35
Latin America	5	10	10	5	-	30
CPEs	5	20	15	15	5	60
North America	-	10	10	5	5	30
Asia-Oceania	-	5	10	5	-	20
Western Europe	-	5	5	-	-	10
TOTAL	90	85	70	40	15	300

Sources: Desprairies (President IFP) et-al 1984, 1986
(OPEC SECRETARIAT)

TABLE 5

OIL RESERVES AND CRUDE OIL PRODUCTION IN AFRICA

COUNTRY	ESTIMATED PROVED RESERVES					
	OIL (106) BBL)			GAS 109 Cu.ft.		
	1984	1985	1986	1984	1985	1986
ALGERIA	9,220	9,000	8,820	110,180	109,100	107,080
ANGOLA	1,700	1,800	2,000	1,550	1,650	1,780
BENIN	100	100	100	-	-	-
CAMEROON	520	550	550	4,200	4,150	3,880
CONGO	400	480	650	2,150	2,118	2,470
COTE D'IVOIRE	108	108	125	3,020	3,000	2,118
EGYPT	3,450	3,200	3,850	7,100	7,000	7,060
GABON	490	510	520	500	550	420
GAMBIA	-	-	-	-	-	-
GHANA	3.8	3.8	3.8	4	4	4
LIBYA	21,270	21,100	21,300	21,350	21,200	21,390
MOROCCO	0.22	250	250	-	-	-
NIGER	-	-	-	-	-	-
NIGERIA	16,550	16,650	16,600	34,800	35,600	47,000
SENEGAL	750	-	-	-	-	-
SOUTH AFRICA	115	114,500	-	400	350	-
SUDAN	300	300	300	-	-	-
TANSANIA	-	-	-	200	200	800
TUNISIA	1,820	1,514	1,800	4,150	2,224	4,200
ZAIRE	110	110	110	40	30	30
T O T A L	56,907.02	55,540.55	56,734.05	189,644	187,176	198,322

SOURCE: OIL AND GAS JOURNAL

THE EFFECTS OF THE NOVEMBER 1986 DEREGULATION OF THE CANADIAN GAS INDUSTRY -

THE CONSUMERS' PERSPECTIVE

Presented by

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At
The Sixth Annual
International Oil and Gas Markets Conference
September 27-29, 1987
Calgary Convention Centre
Calgary, Alberta

Good afternoon, ladies and gentlemen.

Is the consumer happy? In a word, yes, at least the industrial consumer is happy. But it is not all clear sailing yet and so we must tinge some of our rosy glow with blue. More of this later.

I'm told that the recipe for a good speech, according to the southern preacher who was asked for the secret of his success, is: (i) tell them what you're going to tell them, (ii) then tell them and (iii) then tell them what you told them. So here goes.

I'm going to take a minute or two to tell you firstly who IGUA is, what our aims and objectives are and what we do, with particular reference to our involvement in the events leading up to November 1st, 1986.

I'll review with you our positions on some of the current issues before the various regulatory boards, particularly the National Energy Board's recent Natural Gas Surplus Determination Procedures hearing and some outstanding issues.

And finally I'll discuss some of our remaining concerns such as the Alberta floor price and other constraints to a market-responsive environment - the blue edging to our glow that I mentioned earlier.

Before I go any further, let me say right up front that IGUA believes that if this brave new world of a market-responsive environment is to succeed and endure, all the players will have to get a reasonable share of the benefits pie: the producers, the transporters and distributors, the customers and the various governments involved. Certainly we are well on the way to receiving our share. We are troubled that the producers and the producing provinces do not see themselves as having received all that they were looking for, particularly in improved export sales and revenues. It is because of this apparent shortfall in expectations to date that we have concerns that the Agreement on Natural Gas Markets and Prices may be starting to become unglued at the edges.

Who is IGUA? - fair Sylvia, to paraphrase the poet. The Industrial Gas Users Association, IGUA for short, is a voluntary association of industrial firms which purchase natural gas as feedstock and/or fuel. We were organized in 1973 at the time of the first world oil price shock to represent our members' interests before various regulatory boards (National Energy Board, Ontario Energy Board, Régie de l'électricité et du gaz du Québec) and before various federal and provincial authorities. We are working hard at becoming an effective lobby group in addition to our traditional role as intervenors in the regulatory process. In this regard may I say that we have very good relations with CPA and IPAC and I believe that this relationship is important to all of us so that we can wear each other's hats from time to time in order to appreciate the other's point of view.

IGUA has grown to 59 member companies in Manitoba, Ontario and Québec. There is now a SIGUA in Saskatchewan. We would welcome a liaison with similar groups in the other provinces. We are divided into five industrial sectors: Pulp & Paper, Iron & Steel, Mining & Smelting, Chemicals and Other Industrial. IGUA members in Ontario and Québec represent between 60-90+% of the natural gas consumption in each of these major industrial sectors except for the catchall Other Industrial. Our members' total consumption last year was 194 Bcf or 205 PJ for those of us who have made the metric leap.

Our objectives:

- Market responsive prices.
- A secure supply of natural gas.
- Fair and equitable transmission and distribution rates.
- Elimination of arbitrary controls affecting the markets for natural gas.
- Effective communication of its members' concerns and objectives to governments, producers, utilities, and to other trade associations.

> Up-to-date communications with its members concerning current and impending policies, legislation, pricing and supply issues.

And finally - why our overriding need and concern for market-responsive pricing? We all know that industrial firms in Canada must compete not only in our domestic market against import competition but also in export markets. We are particularly conscious of our U.S. competitors, but many of our members' products are also world commodity items: fertilizer producers competing against urea imports from East Germany and Romania, steel producers against Brazil and South Korea, pulp and paper producers against the Scandanavians, copper from Chile and Zaire, nickel from Russia and the Philippines. If they're not coming through the door they're coming through the window. The competition is not simply Canadian or U.S. it is global - the global village.

An important point to note however is that our focus is on our gas pricing relative to the U.S. While absolute values are obviously important it is relative pricing that is critical. This of course is heightened by the current free trade negotiations.

Turning to our involvement in the discussions leading up to the Agreement on Natural Gas Markets and Prices signed on October 31, 1985, I think, like the Virginia Slims ads, we've come a long way baby!

I can remember clearly that when the National Energy Program came out promising us the lowest natural gas prices of any industrial nation we thought this was a great idea. We believed it deserving at the time for traditional Canadian reasons: smaller scale of operations than our U.S. competitors and hence higher unit costs, a cold climate and hence higher plant construction costs, a huge country and hence higher transportation costs. We also thought that the Toronto City Gate Price as the floor for export pricing was appropriate for the same sort of reasons.

When we became involved with the Summit Planning Group we became more aware of some of the negative consequences of these policies. We were conscious that our long-term interests are best served by a healthy producing sector (a pretty obvious axiom) and so we moved for example to recommend the contiguous border price for export pricing. Our next evolutionary step took place during the recent NEB surplus determination procedures hearing when we abandoned support of the formula approach to determining surplus and recommended a contractual approach. Neither of these steps away from the comfortable cocoon of protection to the brave new world of market-responsive pricing was taken without some qualms on the part of some of our members. The point I wish to make is that IGUA made these moves on a voluntary basis before they became government policy and we were not dragged along kicking and screaming after the fact. I must say I feel irritated whenever someone uses the term Halloween Agreement in the sense of more trick than treat - I think it reflects a reluctance to recognize the need for change.

IGUA's current view of the world is perhaps best set out in our argument in the NEB surplus determination procedures hearing. If you will bear with me, I'll quote as follows:

> "In summary, IGUA suggests,
>
> (i) The National Energy Board should retain its jurisdiction to issue licences for the export of gas and to revoke or suspend licences to export gas pursuant to Section 83 and 84 of the National Energy Board Act.
>
> (ii) Under appropriate contracting conditions, the Board can rely on the results of the contractual process when considering exportable surplus issues.
>
> (iii) Before the results of a contractual process for protecting security of supply can be given greater weight when considering exportable surplus issues, the Board should be satisfied that,
>
> (a) domestic gas users have been made aware of an obligation to contractually protect their reasonable foreseeable requirements,
>
> (b) domestic gas users have had a reasonable opportunity to negotiate supply security for their reasonably foreseeable requirements, and
>
> (c) an appropriate atmosphere of contracting flexibility exists so that gas users will not be reluctant to commit to long term gas supply contracts and the companion long-term gas delivery arrangements that are necessary to secure their reasonably foreseeable requirements."

IGUA's position is that the user who contracts for a direct purchase must accept the supply risks of having done so when it comes time to renew his contract. In other words, the user must consider natural gas in the same way that he would any other commodity that he purchases. However, we have one caveat and that is we rely on the Board to continue to exercise its responsibilities under Sections 83(a) and 84(1)(b) of the National Energy Board Act. For this reason we welcome the Board's "Complaints Procedure" and "Natural Gas Market Assessment" monitoring procedure.

On the question of monitoring export prices versus domestic prices, I must note our disappointment with the first EM&R "Natural Gas Price Monitoring Report". The Report appears to have the purpose of reporting trends between the two sets of prices. What Canadian gas buyers need to know is whether they are being as successful in buying Canadian gas as their U.S. competitors are in buying Canadian gas and if not, why not. The Board in our view has recognized this legitimate need in its "Complaints Procedure". Two specific complaints I have of the EM&R report are (i) that the domestic price at the Alberta border is an aggregate of "intra" and "ex" prices and (ii) that the export price is an aggregate of all export points from Huntingdon, B.C. to Phillipsburg, Québec. What is particularly galling to me as a Canadian citizen is that for the price of a phone call to a friendly foreign power, the U.S. Department of Energy, I can get masses of information. I think we all will be better served if everyone knows what the facts are so that better decisions can be made.

What are the remaining impediments to a truly market-responsive environment? The National Energy Board took cognizance of some of those concerns when it stated in its Reasons for Decision on page 9:

> "IGUA's position was that it supported contractual protection only if there were significant reductions in restrictions to transportation flexibility on transmission and distribution pipelines. In particular, it sought the assignability and transferability of rights to gas and transportation services if it turns out a party holding such rights no longer requires them."

For a broader perspective, I would like to quote from a speech titled "Remaining Obstacles to Direct Purchase" which our counsel Peter Thompson made to the Insight Educational Services Gas Deregulation Seminar in Toronto on September 16th. I think they reflect a clear and insightful analysis of the current situation.

"Before a deregulated pricing regime can become firmly established in Canada for the foreseeable future, governments and regulatory authorities in the producing and consuming provinces must reach a consensus view on the essential characteristics of the regime that was intended to be established. The absence of a consensus view stands as a threshold obstacle to a deregulated regime for the pricing of gas in Canada that will endure for the foreseeable future. Another threat to such a regime is the failure of access for Canadian producers to U.S. markets to materialize, to the extent anticipated when the Agreement of October 31, 1985, was concluded.

"The essential characteristics of the regime which was intended to be established by the Agreement of October 31, 1985 must first be identified in order that the deregulated playing field can be delineated.

"Assistance in identifying these essential characteristics can be obtained from the Report of the Pipeline Review Panel, which analyzed the topic. One of the essential characteristics of the regime intended to be established, as identified by the Pipeline Review Panel, was the presence of as many sellers and buyers as possible. That there should be multiple buyers and sellers was clearly one of the essential characteristics of the regime contemplated by the provisions of the Agreement of October 31, 1985. A second and equally essential characteristic of the regime contemplated by the provisions of the Agreement was that mechanisms would be established to assure that the prices to be paid by all classes of gas consumers would be market-sensitive.

"In these circumstances, it appears that the regime contemplated by the provisions of the Agreement sought to increase the number of buyers and sellers of gas in the domestic market. It was contemplated that there should be some movement away from concentrated buying power and concentrated selling power.

"Events in the early 1970's demonstrated that producer interests will not play the deregulation game on a field where buying power is unreasonably concentrated.

"Conversely, it should come as a surprise to no one that consumers will not play the deregulation game on a field where prices are influenced by an unreasonable concentration of selling power.

"Multiple buyers and sellers are an essential characteristic of the regime contemplated by the provisions of the Agreement. While the regime will tolerate some grouping of buyers and sellers, there are limits beyond which the concentration of buying or selling power cannot be taken in fairness to producers and to consumers.

"Judging by the reaction of Alberta authorities, Manitoba's creation of a buying agent to represent all consumers in Manitoba, except those who make their own direct purchase arrangements, appears to go beyond those limits.

"It is suggested that consuming interests should recognize that tampering with the requirement that there be multiple buyers and sellers poses a serious threat to the establishment of a market-sensitive pricing regime in Canada that will endure for the foreseeable future. Conversely, producing interests should recognize that they cannot prevent the formation of private-sector buying groups to interact the private-sector selling groups through brokers or otherwise, should they decide to so choose.

"Residential, commercial, and small industrial consumers would not likely choose to form buying groups to acquire gas to displace supply currently being acquired through distributors if the wholesale prices in existing distributor supply contracts were appropriately market-sensitive.

"The delicate hurdle for producing and consuming interests to clear is to delineate the playing field in a way that will enable as many buyers and sellers as possible to freely interact, and at the same time, produce market-sensitive wholesale prices in existing gas supply contracts for those customers who choose to continue to be served thereunder. It is unlikely that the statutory buying agent concept will provide an acceptable answer to this delicate problem. It is suggested that a more palatable way to provide adequate market-sensitivity in gas prices for customer classes served with system gas supply lies not in the concentration of buying power through the creation of statutory buying agents, but in providing brokers with broad access to consumer interests and to transportation services, and by introducing into existing gas supply contracts, a price redetermination and arbitration mechanism that will assure that prices in those contracts will change in a timely fashion in response to changing market conditions."

Mr. Thompson had this to say on the export market.

"As events have unfolded for Canadian gas exporters, regulatory and contractual problems in the U.S. have surfaced as the major impediments to gaining broadened access to the U.S. market. If the U.S. Market does not open up for Canadian gas producers, then producing provinces may not continue to tolerate deregulated pricing in the domestic market. Producing provinces may conclude that deregulated pricing in the domestic market is not fair to producers if the condition of surplus gas supply is likely to continue for the long-term as a result of regulatory and contractual constraints in the U.S.

"For producers, the export market playing field is not being delineated as expected. This situation poses a threat to the longer-term availability of the direct purchase gas supply alternative in Canada."

And finally, his remarks with respect to removal permits.

"The removal permit process will be used to effectively control price and other conditions applicable to gas leaving the producing provinces as long as producing province authorities perceive the deregulated playing field to be unfair to producers.

"Such use of the removal permit process can be expected to continue until it is ruled to be constitutionally invalid, or until some consensus is reached by producing and consuming provinces about the essential characteristics of the deregulated playing field, including the mechanisms to be established to introduce adequate market-sensitive pricing into existing contracts."

In closing out my presentation today I've decided not to follow the good preacher's advice and tell them what I told them and thereby run the risk of only getting a passing grade or worse.

Let me conclude by saying that IGUA has a real concern whether the market-responsive environment contemplated in the Agreement on Natural Gas Markets and Prices will survive. The necessary atmosphere of consultation, cooperation and conciliation necessary to such a sea change in the way we do our gas business requires careful nuturing at this critical go/no-go point in time. We are encouraged that the Ministers of Energy of the federal and producing provinces recently reaffirmed their commitment to the principles of the 1985 Agreement and announced their intention to begin a new round of discussions involving the consuming provinces. It will be the aim of those discussions to bring about an "orderly transition from the regulated world to the deregulated environment that is fair to both producers and consumers".

Colour me rosy with a tinge of blue.

INDUSTRIAL GAS USERS ASSOCIATION
L'ASSOCIATION DES CONSOMMATEURS INDUSTRIELS DE GAZ

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NL Chem Canada Inc		x	
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Continental Can Canada Inc	x	x	x
Canadian General Electric Company Limited	x	x	x
Canadian Mist Distillers Limited	x		
Champlain Industries Limited	x		
Consumers Packaging Inc	x	x	
Courtaulds (Canada) Inc	x		
DomGlas Inc	x	x	
Dominion Textile Inc	x	x	
Ford Glass Limited	x		
IKO Industries Ltd	x		
Labatt Brewery Ltd		x	
La Brasserie Molson du Quebec Limitee		x	
Nabisco Brands Ltd	x	x	x
Navistar International Corporation Canada	x		
PPG Canada Inc	x		
Redpath Sugars	x		
St Lawrence Cement			
3M Canada Inc	x		

1/87

CANADIAN MARKET DEVELOPMENTS

Presented by
G.W. (Scotty) Cameron
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Pan-Alberta Gas Ltd.
Calgary, Alberta

At
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Introduction

My assigned task today is to comment on "Canadian Natural Gas Market Developments", and in doing so, I would like to comment briefly on - firstly, what Pan-Alberta Gas is; a brief history of the development of the Canadian Market for natural gas; the regulatory evaluation that has taken place in Canada, with special emphasis on the October 1985 Deregulation Agreement between the Governments of Canada, Alberta, B.C. and Saskatchewan; a few remarks on how the U.S. Deregulation process has affected the Canadian Natural Gas Market, and finally - what we see as the future for Canadian Gas Markets.

1. Pan-Alberta Gas

First the commercial. Pan-Alberta is a true risk taking natural gas marketer - formed back in the early 1970's - where we purchase natural gas from over 400 Canadian producers, and sell to markets ranging from B.C. to Quebec in Canada, and from California to Florida to New York in the United States. The bulk of our markets presently are in the United States, where presently, we account for approximately 30% of all Canadian Natural Gas Exports.

2. History

Canadian gas has grown from a small insignificant commodity to one of great importance in the Canadian economy. Domestic sales of natural gas in Canada have gone from approximately 9000 million cubic metres in 1960 (318 Bcf) to 48000 million cubic metres in 1986 (1700 Bcf). And on the export side, sales have gone from 2600 million cubic metres in 1960 (91 Bcf) to 21000 million cubic metres in 1986 (737 Bcf). In the 60s and early 70s gas consumption grew at a rapid rate of about 10% per year. Since that time its consumption from year to year has slowed down somewhat, and has even decreased in some years, however, its importance remains.

Natural gas prices have also seen a substantial growth over time as a direct result of its increased importance and demand. Alberta wellhead prices have gone from as low as 10¢ Cdn/MMBtu in 1955 to close to $3.00 Cdn/MMBtu in 1984. Today, due to deregulation, Alberta wellhead prices vary, but average around the $1.75 Cdn/MMBtu.

This growth and development of the Canadian natural gas market has been directly influenced by government/regulatory involvement mainly within Canada, but also in the States as well.

These regulatory issues over time have dealt mainly with exports, pricing (both domestic and export) and a transportation evolution. I will touch on each of these three areas, as they very much effect the Canadian market we are living with today.

3. Regulatory History

a. Exports

Public policy has been divided on the issue of natural gas exports to the United States ever since the Leduc discoveries in 1947. The two schools of thought have been:

1. treat natural gas as a free moving commodity; or
2. treat natural gas as a scarce non-renewable resource, and therefore strongly protect future Canadian requirements before allowing export sales.

- As early as 1953 Mr. C.D. Howe, Minister of Trade and Commerce, stated in the House of Commons "...The policy of the government of Canada is to refuse permits for moving natural gas across an international boundary until such time as we are convinced that there can be no economic use, present or future, for that natural gas within Canada".

- The licensing of exports of natural gas at this time and as it had been since 1907, was the responsibility of the Minister of Trade and Commerce.

- In 1957, at the same time as the TransCanada Pipeline project was underway, the government of Canada appointed a royal commission on energy (Borden Commission) that made the recommendation to set up an independent quasi-judicial tribunal in charge of determining the exportable surplus of natural gas and reviewing the terms of the export contracts. From this the National Energy Board (NEB) was set up in 1959.

- The Surplus Test, from its conception cited above, has gone through many revisions. The most recent surplus test used prior to September 9, 1987 involved a reserves ratio to demand projection. The NEB decision of September 9, 1987, which I will discuss in more detail in the deregulation section of my talk, has eliminated this surplus test, making exporting easier, but not ignoring the issue completely. The NEB still will have a monitoring role.

4. Pricing

i. Domestic

- Historically gas was purchased under long-term contracts freely negotiated between seller and buyer. Typically, these contracts included a base price valid for an initial period with provision for subsequent modification by price escalations of a predetermined amount and timing, and/or periodic price redeterminations through negotiations, or if necessary, arbitration. The point of transfer of the gas from Seller to Buyer was at the field, thus the transportation costs were an add-on from the field (opposite from the netback market-driven system of today). Prices, between 1955 and 1973, ranged around 10 - 20¢ Cdn/Mcf. The period from 1955 to 1973 was an era of "free market" pricing.

- In 1970, as a result of price increases in other fuels, as well as gas price increases in our export markets, the NEB established a minimum export price. This was the first attempt to set prices above contract prices.

- In 1973, during the energy crisis, officials in government and industry felt that natural gas should be priced in relation to its commodity value (its value in relation to other energy sources). Thus, after an Alberta government (ERCB) price inquiry that found gas to be under-priced, the average price for gas removed from Alberta rose rapidly. By 1974 prices averaged 46¢ Cdn/Mcf.

- In 1975 the Federal government passed the Petroleum Administration Act which allowed the Federal government to set the price of gas sold outside a producing province by entering into a pricing agreement with the producing province. The Federal budget of June 1975 announced that effective November 1 the field price of gas would be set on the basis of a Toronto city gate price of $1.25/Mcf (81¢/Mcf at the Alberta Border). This price was based on an acquisition cost of crude oil at

Toronto. An agreement between the Alberta and Federal government was signed that established a price schedule to mid-1978.

- In September 1981 another similar agreement was signed that was supposed to set the price schedule from 1981 to 1987. This was the method used until the 1986 deregulation of the natural gas industry, to be discussed shortly.

5. Export Pricing

Export prices in Canada have always required approval of the Canadian government or its agent (the NEB). Prior to 1959 the Canadian government approved export prices. From 1959 to 1982, export prices were set pursuant to the NEB Act. In 1982, amendments to the Act gave full authority to the government. The government took over this responsibility because energy issues had become very important over the years. Hence the Ministers of Energy between the two countries wanted more direct involvement.

- The 1960s and early 1970s were essentially a free-market era with negotiations between parties, followed by NEB approval.

- From 1974 onward, the NEB took a more active role in the price setting process by holding public hearings, and making efforts to value Canadian gas according to the commodity value of energy in various export markets.

- In 1977 the US government requested that a uniform border price be set for all export gas. Prices ranged at that time from $1.80 to $2.10 Cdn/Mcf. The first uniform border price was set at $1.94 Cdn/Mcf.

- In April 1977 the NEB introduced the concept of substitution value as the main criteria for determining the value of export gas. This culminated in the "Duncan/Lalonde" letter agreement in 1980 whereby the respective Ministers of Energy agreed to set an export price of gas equal to the average cost of crude oil imported into Eastern Canada, with certain transportation adjustments.

- In 1983 the Federal government implemented the volume related incentive pricing mechanism (VRIP) whereby all volumes sold over an annual base amount could be sold at a discount price. The uniform border price at this time was \$4.40 US/Mcf, and the incentive price was set at \$3.40 US/Mcf. This VRIP program was intended to respond to the US export market that was in transition at that time.

- In 1984 the Economic Regulatory Agency (ERA) of the US Department of Energy, which has jurisdiction over imports, issued a new policy limiting additional Canadian export sales (from new licences recently approved by the NEB) until Canadian contracts were modified to incorporate market-responsive pricing clauses. The Canadian government allowed export prices to vary from one export point to another, though in all cases the floor price would be the price paid by Canadians for similar service in the area adjacent to the border point.

6. Transportation

The major early development in the transportation of Canadian natural gas was the formation in 1955 of the Alberta Gas Trunk Line Co. Ltd. -- now NOVA Corporation of Alberta. It provides transportation within the province of Alberta, and on its commencement in 1956 -- provided transportation to the Alberta border for a single customer -- TransCanada Pipelines.

- TransCanada's pipeline was completed in Ontario in 1956 and now extends from the Alberta/Saskatchewan border into the province of Quebec. This system provides access to the major domestic markets in Ontario and Quebec.

- In 1957 Westcoast Transmission's gas pipeline was completed from northern British Columbia to Vancouver. Similar to NOVA in Alberta, Westcoast gathers gas from B.C. wells and transports it to either TCPL, or for export at the B.C./Washington border.

- In 1961 a small pipeline in SE BC was completed by the Alberta Natural

Gas Company Ltd. to take gas from SW Alberta to the US Border. This was Alberta & Southern Gas Co., a subsidiary of Pacific Gas & Electric.

- Lastly, the Prebuild of the Alaska Natural Gas Transportation System was built by Foothills Pipe Lines. The West Leg, which takes gas from Alberta to the American/BC border, started to flow gas in 1981, and the East leg, which runs from Alberta to the American/ Saskatchewan border, was flowing gas by 1982.

- All these pipeline construction projects helped to enhance the Alberta natural gas industry by transporting gas from Alberta to most regions in Canada and down into the United States.

B. Deregulation

1. What was Deregulation?

- The October 31, 1985 Agreement on Natural Gas Markets and Prices between Canada, Alberta, B.C. and Saskatchewan, committed governments, regulators and industry to market-sensitive prices in domestic and export markets.

- The Agreement which was to become effective November 1, 1986 (one year of transition) had the following principles:

-- to create a regime in which natural gas prices and other contract terms could be negotiated freely between buyer and seller;

-- to enhance the access for Canadian buyers to natural gas supplies, and for Canadian producers to natural gas markets;

-- to foster a competitive market for natural gas in Canada;

-- the elimination of any alternate-fuels pricing test for gas competing in export markets; and

-- not to obstruct negotiated commercial transactions.

The Agreement was the tool towards gas industry deregulation, however, some regulatory features remained, such as:

-- provincial removal permit authority;

-- cost-based toll regulation of pipelines under NEB jurisdiction;

-- consideration of foreseeable Canadian requirements in the approval of long-term gas export licences, and

-- assurance that Canadian users have access to prices at least as low as those available to U.S. buyers of our gas.

- The deregulation process is still very much in turmoil after nearly one year. This deregulation document was not cut and dry and therefore has lead to different interpretations of many issues. I will discuss these issues briefly, however first some examples of the good things deregulation has done.

2. How Deregulation is Working

Some positive effects of deregulation have been, in the domestic market -

(1) gas sales grew in Quebec by 2% in a market that has fierce alternative energy competition,

(2) market gains in Ontario can be illustrated by the 42,000 new residential customers in Consumers Gas market area in 1986,

(3) direct sales have grown from 3.5 Bcf to 72 Bcf in one year,

(4) there are 40 new shippers active in the interprovincial market.

- On the export side -

  (1) spot market exports into the U.S. have gone from approximately 2,300 MMcf/month before deregulation to 25,000 MMcf/month since deregulation,

  (2) exports to Northern California have increased 48% and sales to the northeast US at Niagara are at 92% rate of take,

  (3) the natural gas consumption in the US has decreased over the past year, and it is very encouraging that Canada has been able to still compete in this smaller market. Without our deregulation that allows us to negotiate prices with US buyers, we would have lost a bigger chunk of the market.

- One last, positive point, especially from an Alberta viewpoint, was the announcement September 9 by the NEB that it has done away with the "surplus test" requirements for exporting. The NEB stated that "market forces will be allowed to operate freely as long as they are serving Canadian needs adequately and fairly".

- While I don't see this resulting in any immediate significant increases in our exports, we do see it as a strong long term signal to the export market that Canadian supplies can be looked at as being long term and secure.

3. Unresolved Deregulation Issues

Issues still to be resolved and that have surfaced as a result of deregulation are:

-- what is a core market, and should it be treated differently?;

-- Manitoba government's new company - Manitoba Oil & Gas Corp.;

-- Several Ontario Energy Board decisions;

-- Pending TCPL facilities hearing.

These unsolved issues mainly stem from different points of view between the producing and the consuming provinces, as has been discussed earlier this afternoon by Ted Bjerkelund and Michael Stewart.

Touching briefly on the four issues:

- Core Market Issue -- What defines the core market? In Alberta we believe it consists of the residential and small commerical sectors, including essential services (government, social and educational) that do not have the capability to switch from gas to oil. We feel these end-users of natural gas require long-term future supply protection, and thus should pay a premium for this future protection. We in Alberta feel they cannot have the best of both worlds, at the expense of the producers. This hotly debated issue leads into the next unresolved issue.

- Manitoba Oil & Gas Corp. -- is a provincial corporation set up to replace Manitoba's current utility company, Intercity Gas. This new government company wishes to negotiate new gas supply contracts and displace the current contracts held between TCPL's marketing affiliate, Western Gas Marketing and Manitoba's InterCity Gas. Last week, the National Energy Board denied an application by the Manitoba Corporation asking for an order from the Board directing TransCanada PipeLines to transport gas for it.

- The Board has delayed its "Reasons for Decision" until about mid October, but the basic decision is one that naturally will set a procedence for other Provinces and Utility Companies on how they might treat their existing purchase contracts.

- The Ontario Energy Board (OEB) has done several things that we in Alberta feel are not in keeping with the intent of the deregulation papers signed in October 1985. The OEB only approved the contracts signed by Western Gas Marketing and the utility companies in Ontario for a one-year period, even though the contracts were negotiated between the two parties for a two-year period. The one-year period is almost up and the utility companies are in the process of renegotiating once again. It will be interesting to see what the OEB does this time. The OEB has also approved spot sales in the "core" market in Ontario which goes against Alberta's view of paying a premium for protection.

- Lastly, another issue in debate is the upcoming TCPL facilities hearing. TCPL is adding more capacity onto their pipeline so as to be able to export more gas through Niagara into the NE US. The issue under debate is the way the incremental facilities are charged out. Should it be rolled-in with their other tolls so that all customers on the pipe share these new costs or added-on, whereby only the customers using the new facilities would pay?

- As can be seen, complete results of deregulation are still very much in turmoil and only time will tell how the final results will shake out.

4. U.S. Deregulation Impacts

- Not only do we have our own unresolved issues in Canada, but as Philip Prince and Susan Court discussed, those of us exporting to the States have all the US regulatory hurdles to deal with as well.

- The deregulation of transportation in the States and the gas to gas price competition has had an effect on our export volumes as well as our domestic volumes.

- The US deregulation has allowed for non-discriminatory access to transportation on the US pipelines. This idea will eventually help the deregulation process, however, it is still in the US courts and there are many other factors associated with this open access concept that need to be resolved between the various parties before there is truly open access on US pipelines.

- Another US regulatory issue is the "as-billed" issue. As discussed earlier this afternoon, this also is a hurdle for Canadian gas flowing to the US, as we cannot flow Canadian gas economically to the US without passing through all reasonable fixed costs to the customer.

- The take or pay problems in the US between producers and pipelines encourages relationships between conventional US producers and pipelines so that they can resolve their existing take or pay problems. This is a disadvantage for Canadian producers trying to break into the export business.

- The last point I'd like to make on how the US deregulation has affected Canada is in the area of pricing. To be able to compete in the US market, our Canadian gas has had to remain market-responsive. Due to the current over-supply of gas, this competition has led to lower prices for our export gas, and as a result, lower priced gas in Canada as well. To a great degree, Canadian domestic pricing will in the future continue to be influenced by the pricing scenario in the U.S.

- One thing that can be said from all this is that there is never a dull moment in the gas industry.

C. Future Lastly, where does this all leas us to in what the future have to offer?

- More change as the unresolved issues slowly get sorted out and new ones develop.

- The competition will increase which will require that all players (consumers, distributors, marketers and producers) are more heavily involved in, and knowledge of, all aspects of our industry - and certainly in our dealings with Governments and Regulatory Agencies.

- Some currently proposed pipeline expansions will get approved and others will develop which will increase the competition as well. In this regard, a few high profile expansion areas for Canadian gas to flow to the US are:

1. the northeast US

2. Northern Border expansion into the Midwest area.

- The often discussed "gas bubble" will diminish in the 1990's, but when and how and what other factors will prevail in the world at that time will all have a bearing on how the Canadian natural gas industry will function.

- Due to the nature of the North American gas industry, there will always be some form of government control and regulation, both in Canada and the United States.

Finally, due to the increasing fuel switching capacity and other factors, while there is a world surplus of crude, natural gas pricing will continue to be faced with a pricing ceiling set by crude oil.

In a nutshell, I believe we can continue to expect a moderate growth in Canadian natural gas requirements; I believe that - as the U.S. surplus diminishes - we can expect to share to a greater (but certainly not major part) degree in the market; and we can expect governments on both sides of the border to continue to monitor and be involved in our activities.

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U. S. REGULATORY ENVIRONMENT

Presented by
Susan J. Court
Associate General Counsel for Gas and Oil
Federal Energy Regulatory Commission
Washington, D.C.

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I have had the pleasure of addressing Canadian audiences for several years, but have always felt a little self-conscious about using jargon, acronyms and numbers to describe the actions of the Federal Energy Regulatory Commission — my employer and the major natural gas regulator in the United States. For example, "380," "436," "Special Discount Rates," "234-B," "311," "7(c)," "SMP." Today is no different. My topic — the U. S. regulatory environment — is dominated by an F-E-R-C action called Order No. 500. Because of the importance and relative newness of that order, I will spend most of my time on it. I will also briefly discuss three areas, which seem to have significant interest for and impact on Canada — marketing affiliates, sales rates and certain certificate proceedings.

Order No. 500

For neophytes to natural gas transportation in the U.S., a little background to Order No. 500 may be helpful. The passage of the Natural Gas Policy Act nine years ago established a gradual (albeit partial) decontrol of natural gas prices. Decontrol created more competition at the wellhead. That competition in turn exerted pressure on the Commission to allow for more flexible transportation rules — rules that would enable producer/sellers to deal directly with end-user or distributor/buyers without middlemen pipeline/merchants.

The Commission acted in a series of rules and orders. The court, however, was not impressed, and overturned some of these actions because they did not provide pipelines' captive customers meaningful access to the competitive wellhead market. Two years ago — almost to the day — the Commission issued Order No. 436 (a rule, actually) intended to respond to the court's concerns by requiring non-discriminatory transportation. Three months ago —almost to the day — the court reacted. In a decision entitled AGD v. FERC, the D.C. Circuit (a Federal appellate court) upheld the substance of Order No. 436, but nevertheless vacated and remanded the order to the Commission. The court identified three problems with "436" — the absence of direct action on take-or-pay, an insufficient policy and legal basis for requiring transporting pipelines to allow their firm sales customers to reduce and/or convert their entitlements, and an inadequate justification for the "grandfathering" of certain high-priority end-user transactions.

Although the D.C. Circuit "vacated and remanded" Order No. 436, it did not issue its mandate immediately. Hence the order and the authorizations to transport that flowed from it were left temporarily undisturbed. Knowing that the mandate could issue by August 7, the Commission decided to respond quickly to the court's opinion in order to prevent any disruption of ongoing transportation of shipper-owned gas. Such disruption could have significantly affected the industry. Last year, for the first time, the major U.S. pipelines transported more gas than they sold. That trend continued through the first half of this year, with transportation accounting for more than 61% of total throughput.

In less than two weeks after the issuance of AGD on June 23, the Commission stayed the CD reduction and conversion provisions of "436." As I mentioned before, the court had found the rationale for these provisions to be flawed. Also, the court believed they aggravated pipelines' take-or-pay problems. Within two months, the Commission voted in principle an order to respond to the court's concerns. On August 7, the Commission issued that order (No. 500), and an order that would terminate all waivers of the CD adjustment provisions. Two weeks ago — September 15 — the court issued its mandate. By its own terms, Order No. 500 went into effect that day. Certain key features — the crediting mechanism for ongoing transportation and the expiration of the waivers — become effective November 1 (the second anniversary of the effective date of "436"). In light of the court's September 15 decision, the only judicial step left for "436" is the Supreme Court of the United States. I feel fairly confident that "436" is now behind us. "500" is here to stay — at least for a while.

Order No. 500 combines two types of Commission action-- an interim rule and a statement of policy. An interim rule itself combines two types of actions (a hybrid, so to speak). On one hand, an interim rule is like a final rule. It is effective immediately. On the other hand, an interim rule is like a notice of proposed rulemaking. The Commission seeks comments on it in order to develop a final rule. A statement of policy is an articulation of the Commission's views on certain matters, to be applied on a case-by-case basis.

Within the context of these two types of action (interim rule and policy statement), Order No. 500 addresses the three concerns of the court — take-or-pay, CD adjustments, and grandfathering. First, "500" repromulgated all of the "436" regulations with one exception. The Commission did not readopt the contract demand reduction option. It could not on the current record make the findings necessary to satisfy the court's concerns. The Commission continues to believe that the original objectives of CD reductions -- including the freeing-up of unused capacity -- are valid. It requested comments from the parties on what additional information is necessary to meet the court's concerns, so that the option can be readopted. The Commission did readopt the contract conversion option. This, the Commission believes, is necessary to give firm sales customers, especially full requirements customers, a realistic opportunity for immediate access to competitively-priced gas supplies from alternate suppliers.

With respect to grandfathering, the Commission retained the provisions of "436." It found that, contrary to the court's fears about perpetuating unduly discriminatory transportation, the transactions were few in number and short in duration. So, more harm would result by disturbing these authorizations on which parties had come to rely.

The principal aspect of "500," of course, is its provisions on take-or-pay. These provisions include changes to the current rules and two statements of policy. They are intended to address past, present and future take-or-pay problems -- a slippery proposition at best, since even as I speak the future slips into the present which slips into the past. I believe, however, "500" ably deals with this difficult proposition.

Take-or-pay is not a new problem. It has pervaded the U.S. natural gas industry for several years. The magnitude of the problem sometimes is difficult to ascertain; its description frequently depends on the describer. (By the way, as announced in "500," the Commission has sent data requests to the 45 largest U.S. pipelines to help ascertain the extent of their take-or-pay obligations). Nevertheless, the court found take-or-pay sufficiently troublesome— especially "436's" potential for aggravating it — to vacate the rule. The court was concerned about the potential for pipelines' accruing take-or-pay from transporting gas in competition with their own sales and allowing their customers to adjust their sales entitlements. In addition, "436" deprived pipelines of an important bargaining chit — the ability to trade access for take-or-pay relief.

In response, the Commission eliminated the CD reduction provision as I've mentioned. More importantly, it established a crediting mechanism. In general, a pipeline will be able to receive a volumetric credit against its take-or-pay obligations from the producer whose gas it is transporting. This crediting mechanism is "500's" approach to "the present." Its purpose is to minimize if not totally offset and perhaps even reduce the ongoing accumulation of take-or-pay liability.

Here's how the crediting mechanism works.

1. No gas is eligible for transportation unless the pipeline and shipper or producer agree, or unless the producer submits to the pipeline an affidavit offering credits. I stress that parties can avoid the affidavit process by mutual agreement.
2. Pipelines generally may treat a volume of gas owned by a producer on June 23, 1987 which the pipeline transports as a volume taken under any pre-June 23, 1987 contract covering gas owned by that producer on June 23, 1987. This would reduce the pipeline's take-or-pay obligation under the take-or-pay contract by the quantity of gas transported.
3. Details of Crediting
    a. Pipelines may select qualifying contracts against which credits are to be applied.
    b. Credits can be applied against liability occurring in the contract year the gas is transported or in any previous year, commencing on or after January 1, 1986, in which the pipeline transported gas on an open access basis.

c. No credits are available for transportation of (i) gas which the producer formerly sold to the transporting pipeline under a terminated take-or-pay contract and which is not currently subject to a gas purchase contract between the parties or (ii) gas which has been released from a gas purchase contract containing a market-out clause giving the purchaser the right to terminate the contract at will. These exceptions are intended to encourage take-or-pay settlements and negotiation of market-responsive contracts.

d. For other released gas credits are available. However, where a pipeline is already receiving credits under a release agreement, it may not receive double credits.

e. When gas is transported by more than one pipeline, the pipeline which released the gas gets all the credits. If no pipeline released the gas, the pipelines transporting the gas must agree how to divide the credits.

f. In the case of existing transportation, gas will cease to be eligible for transportation on November 1 unless the pipeline and shipper or producer agree or an affidavit is submitted as I described before.

Order No. 500 addresses past and future take-or-pay by statements of policy. With respect to the past, the Commission adopted two acceptable mechanisms that pipelines may use to pass through the costs of buying out or buying down take-or-pay liabilities. The first mechanism, permitted for all pipelines, is to collect the costs through their commodity sales rates. The second mechanism, available only for open-access pipelines, permits a pipeline willing to absorb 25 to 50 percent of the buyout costs, to recover an amount equal to what it absorbs through a fixed take-or-pay charge. The pipeline may bill the remaining costs, up to 50 percent of the total buyout costs, through a commodity surcharge or a volumetric surcharge on pipeline throughput.

The second pass-through mechanism provides pipelines, and their customers, greater flexibility to develop take-or-pay cost recovery proposals which equitably apportion those costs. It reflects what the Commission said in "500," "no one segment of the natural gas industry or circumstance appears wholly responsible for the pipelines' excess inventories of gas. As a result, all segments should shoulder some of the burden of resolving the problem."

Last week, for the first time, the Commission applied its policy on past take-or-pay as articulated in Order No. 500.

The Commission rejected a direct billing mechanism proposed by Transwestern Pipeline Company, which had not agreed to absorb any costs. This rejection was in the context of an opinion on an administrative law judge's initial decision. Currently, two other IDs (in Tennessee and El Paso dockets) are pending before the Commission.

With respect to the future, the Commission adopted, also as a matter of policy, certain principles on which an open access pipeline may fashion a charge for standing ready to supply gas to its sales customers. Such a charge is sometimes called a Gas Inventory Charge or GIC. The principles for a GIC laid out in "500" do not establish any requirements at this time. They only provide the basis for permissive filings by pipelines to establish such charges. These principles are:

a. The pipeline may not recover take-or-pay charges from suppliers by any other means.

b. The pipeline must allow its sales customers to nominate levels of service freely within their firm sales entitlements.

c. The pipeline must announce a firm price or pricing formula before its customers make nominations.

d. The customers must consent to the abandonment of service for any difference between the nominated level of service and their previous firm sales entitlements.

A gas inventory charge would require customers to pay on a current basis for the service provided by the pipeline of contracting for supplies and standing ready to satisfy their purchase requirements. This should help avoid a future recurrence of today's take-or-pay problems. I want to stress that, as a prerequisite to imposing such a charge a pipeline must give its customers a choice of either purchasing gas from the pipeline under the terms offered by it or purchasing from alternative suppliers. A GIC may not be another form of a minimum commodity bill.

Since the issuance of "500," the Commission has considered, and rejected, a GIC proposed by El Paso Natural Gas Company. The Commission found that El Paso had failed to establish a meaningful nomination process in which customers would know what to expect and respond accordingly. Currently, the Commission is considering a GIC filing from Natural, and Texas Eastern and Tennessee are rumored to be preparing such proposals. (Of course, all 3 of these companies import gas from Canada).

Marketing Affiliates

Although "500" dominates the U.S. regulatory environment, I want to touch on three other areas to round out the picture of that environment. Closely connected to "500" — that is, to natural gas transportation — is the issue of marketing affiliates. Marketers -- independent as well as affiliated-- are relatively new to the U.S. natural gas industry. Practically from its (regulatory) inception, the industry entailed pipelines' buying gas in the fields and transmitting it to markets in the cities and along the way. With the increase in transportation of shipper-owned gas came a concomitant increase in marketers. Not long after, the Commission began hearing complaints that marketers affiliated with interstate pipelines were receiving preferential treatment and, in effect, acquiring the benefits of monopoly power without any regulatory oversight.

The Commission responded by a notice of inquiry and then, on June 2, a notice of proposed rulemaking into the alleged anticompetitive practices of affiliated marketers. The proposed rule consists of tariff and non-tariff related standards. The proposed standards among other things would prohibit pipelines from processing an affiliate's transportation requests prior to non-affiliates' requests providing information to affiliated shippers on available capacity unless simultaneously communicated to all potential shippers, and selectively enforcing operating conditions.

Further, pipelines would be required to specify information and format for a valid transportation request; keep logs and records; and develop written procedures to show

how the prohibited practices have been eliminated. The Commission also proposed reporting requirements to provide data for monitoring pipeline and affiliate practices, and suggested remedies to be used if the proposed standards or reporting requirements were violated. The Commission is currently analyzing the approximately 80 comments received, and will probably consider a final rule by the end of the year.

At the same time that it issued the NOPR on marketing affiliates, the Commission established an Enforcement Task Force to resolve complaints of discriminatory activities in the natural gas market. As Chairman Hesse recently announced, the results have been very positive. As of September 18, 83 inquiries had been received on the Hotline, of which 73 (or 90%) have been resolved. Needless to say, we are very pleased, because speedy resolution of disputes and the avoidance of long, protracted hearings and proceedings eliminates that nasty thing called regulatory lag.

Rate Design

Another important area of Commission activity is rate design. Actually, its importance is axiomatic. The principal role FERC plays is setting rates. Unlike the transportation area, there is no single regulatory effort on rate design at this time; rather, several individual proceedings comprise the Commission's current activity, including the ones on take-or-pay.

In addition, the Commission is presently reviewing the comments in a rulemaking to revise its purchased gas adjustment regulations. For the most part, the proposed rule would simply codify Commission decisions on the operation of the PGA mechanism made over the last few years. PGA proceedings, of course, have been of special interest to Canadians. They have been the forum for determining the appropriate rate treatment for costs associated with Canadian gas. Last December, the Commission issued Opinion No. 256 in a PGA docket of Natural Gas Pipeline Co. of America. In that opinion, the Commission concluded that to assure that domestic and imported supplies are afforded equal treatment, Natural had to shift certain costs from its demand to its commodity rates. Natural had been billing customers in a demand charge costs which if associated with U. S. supplies would be billed through a commodity charge.

To date, the Commission has applied Opinion No. 256 to Northern Natural, Northwest, Tennessee, Texas Eastern, ANR, Midwestern, Granite State and Great Lakes. It exempted Boundary, which it found to be an administrative conduit. The Commission has also ordered Great Lakes to show cause why it should be allowed to continue using a segregated PGA for its Canadian gas purchases, and is currently reviewing the comments received in response to that order. So far, only Tennessee and Midwestern have complied with the Commission's directions to follow Opinion No. 256.

Other rate proceedings worth watching are two involving the implementation of Order No. 436/500 regarding particular pipelines — Texas Eastern and Consolidated Gas. At last week's public meeting, the Commission considered orders on rehearing of these companies' 436 settlement orders. In both, it deferred action on proposals, previously rejected, to broker capacity. The significance of the deferral is that the Commission is considering whether to permit some form of capacity brokering. Among the issues raised is whether and how to regulate any secondary, tertiary, etc., markets. Of course, the creation of such markets raises additional questions about marketing and other affiliates.

Also, in the Consolidated proceeding, the Commission voted to set for hearing the "unbundling" of Con Gas' transportation rates. More specifically, the Commission held that Con Gas' rates should be "unbundled" — that gathering, storage, and extraction costs should be separately stated and billed. However, the Commission recognized that it did not have the factual record to say what those rates should be. The hearing is intended to develop that record. The purpose behind "unbundling," of course, is that customers pay for what they use — no more, no less.

Certificate Proceedings

My final topic for discussion of the U.S. regulatory environment is current certificate proceedings for new construction. Since we're in Western Canada, I'll start in the West and head East.

The major certificate proceeding to bring new natural gas service to the West, specifically the EOR market in California, involves the applications of Mohave and Kern River. Over a year ago, the Commission consolidated these applications into a single proceeding, which has been split into two phases. Phase I involves the certificate and rate issues. A hearing in that phase began on September 9. Over one-hundred witnesses are scheduled, and the hearing is anticipated to last between six and eight months. Phase II involves the environmental matters. A final environmental impact statement will probably be done in early December. A one-week hearing is expected.

Since the Mohave/Kern River proceeding is a contested matter, I cannot tell you much more than the procedural status that I just described. Within that context, I'll mention one last item. On August 4, 1987, Wyoming-California Pipeline Company (or Wy-Cal) filed an application under what is called optional certificate procedures to serve the EOR market. Several parties — namely the California PUC, So Cal Gas and PG&E — want the Commission to consolidate the Wy-Cal application with the Mohave and Kern River applications. Others, including all three applicants, oppose the request, which is currently under Commission consideration.

With respect to the East (actually the Northeast) the Commission recently took an action which was not unprecedented but definitely unusual. It opened what I call a "window of opportunity." Any applicant wishing to construct new facilities to serve Northeastern markets has until January 15 (the day the window closes) to submit its filing to the Commission. Any subsequently filed applications run the risk — a very real risk, I might add — of being subordinated to those filed by that time.

Anyone who has followed the Commission's Boundary and other Northeast certificate proceedings will understand the importance of and need for a certain, definitive procedural approach to certification of Northeast projects. Since 1980, the Commission and literally hundreds of parties have struggled with and in such proceedings. The result has been the certification of bits and pieces of projects and services, but never of the size or magnitude to satisfy the apparent need. With its "open season" order, issued in July and amended last week, the Commission hopes to bring to conclusion the matter of new construction and service for the Northeast.

Conclusion

At this point, I will conclude my remarks on the U.S. regulatory environment. In one sense, that environment is characterized by stability. For several years, the Commission has been dedicated to injecting greater competition into a once pervasively regulated industry. Today is no different. In another sense, or perhaps from a different perspective, that environment is characterized by flux. In order to achieve its goal of greater competition, the Commission has changed the rules, as recently as August 7. That has to create uncertainty. One thing is fairly certain, however. The regulatory structure that will be around for a while is the one created by the Commission two years ago in Order No. 436, and readopted and modified by the Commission last month in Order No. 500. Perhaps the Commission will make further modifications as it develops a final rule. But the thrust of the regulatory structure should stay the same--nondiscriminatory access to a competitive wellhead market.

Thank you.

Bank of America

Quarterly Energy Report

Report No. 29
July 1987

Spot oil prices during the second quarter averaged $19.41 per barrel, up from $18.27 per barrel in the first quarter. Prices rose throughout the second quarter and have continued to strengthen thus far in the current quarter, averaging over $22 per barrel recently.

Rising oil prices during the first half of the year are attributed to increased oil consumption and a fairly high degree of adherence to production quotas by most OPEC member countries. Increased political instability in the Mideast, with the potential for disruption of oil supplies from this region, also has contributed to the most recent price increases. Approximately 15 percent of oil consumption by non-communist countries moves through the Hormuz Strait and disruption of this flow would result in a substantial short term run-up in prices.

Spot oil prices are forecast to decline from current levels during the next few months as speculation regarding disruption of Persian Gulf oil supplies subsides and oil prices respond to underlying supply-demand conditions. Spot prices are forecast to fall to $19 per barrel in the fourth quarter of the year, averaging $19.17 for 1987 as a whole. Prices are expected to stabilize at $19 per barrel in 1988 as OPEC increases production to match slightly higher oil consumption stemming from expansion of world economic activity.

Oil Price Forecast (60% probability)
(West Texas Intermediate Crude Spot Price, $ Per Barrel)

	Quarter				
Year	I	II	III	IV	Average
1986	16.85	13.88	13.89	15.40	15.01
1987	18.27	19.41	20.00	19.00	19.17
1988	19.00	19.00	19.00	19.00	19.00

After achieving a high degree of success in stabilizing its average oil price at approximately $18 per barrel in the first half of the year, OPEC agreed at its meeting in June to restrict production to 16.6 million barrels per day (mmbd) through year-end 1987. While terms of the agreement will be adhered to by most members of the organization, some over-quota production is expected. Production above quota will derive mostly from Iraq, not a signatory to the agreement, as it expands its oil pipeline capacity. The UAE also will exceed its assigned quota. As a result, total OPEC production is likely to average 18.1 mmbd during the last half of the year. During the second quarter, OPEC production began to rise, reaching an estimated 17.4 mmbd in June relative to the organization's first-half quota of 15.8 mmbd. Even with production of 18.1 mmbd, OPEC will be able to maintain the $18 per barrel target for the average of its crude oil prices.

Oil consumption in market economies is forecast to increase one percent this year. With oil production in non-OPEC countries expected to remain at 1986 levels and with an inventory drawdown averaging 400,000 barrels per day, demand for OPEC production this year will average 17.3 mmbd.

World Oil Markets
(mmbd, Market Economies)

		1986		1987
Oil Consumption		46.7		47.2
Oil Production		47.9		46.8
OPEC		19.6		18.5
Crude Oil	18.4		17.3	
Natural Gas Liquids	1.2		1.2	
Non-OPEC		28.3		28.3
Crude Oil	22.5		22.5	
Other *	5.8		5.8	
Inventory Change		1.2		-0.4

* Includes natural gas liquids, refinery gains, and net exports from centrally planned economies.

OPEC's ability to maintain price stability is predicated largely on increased demand for OPEC oil stemming from rising world oil consumption. Absent such higher consumption, greater production discipline would be required by OPEC members, causing serious disagreements within the organization regarding allocation of quotas. Under such conditions, oil prices are likely to fall as OPEC is unable to make the production adjustments necessary to maintain prices. A scenario of low oil prices, stemming from weaker demand and OPEC disarray is presented below:

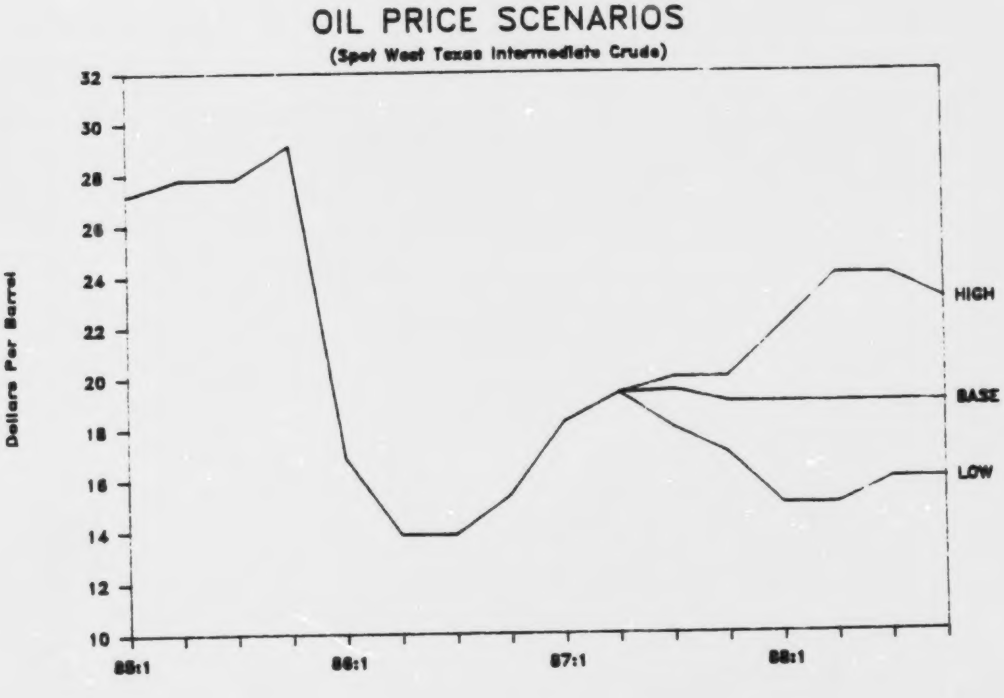
Low Oil Price Alternative (20% probability)
(West Texas Intermediate Crude Spot Price, $ Per Barrel)

	Quarter				
Year	I	II	III	IV	Average
1987	18.27	19.41	19.00	17.00	18.42
1988	15.00	15.00	16.00	16.00	15.50

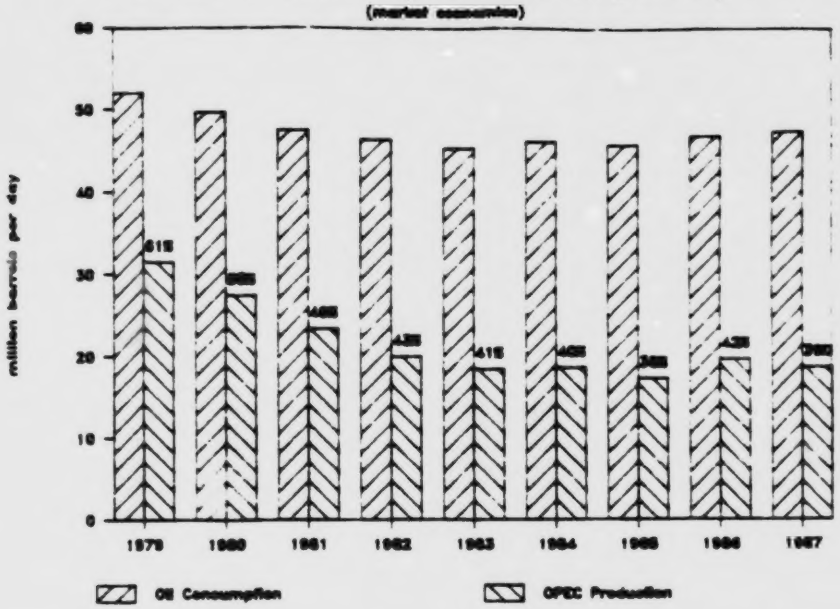
Prospects also exist for higher prices than incorporated in the standard forecast. Such a result could arise from a combination of factors, including an escalation of conflict in the Middle East, more rapid growth in world oil consumption, and strict adherence to production quotas by OPEC member countries. Under such conditions, OPEC could be expected to ratchet prices upward as shown below. The longer-term effect of such sharp price increases will be to trigger increases in non-OPEC production while also reducing world oil consumption, setting the stage for lower prices at the end of this decade.

High Oil Price Alternative (20% probability)
(West Texas Intermediate Crude Spot Price, $ Per Barrel)

	Quarter				
Year	I	II	III	IV	Average
1987	18.27	19.41	21.00	21.00	19.92
1988	22.00	24.00	24.00	23.00	23.25



World Oil Consumption and OPEC Output



The Quarterly Energy Report is a product of the Bank of America's Economics-Policy Research Department/Energy Forecasting Group, located in San Francisco: Admassu Bezabeh (415/622-2077), Richard Courtney (415/622-8763), Sheldon Engler (415/622-2074), Jeanette Garretty (415/622-2682), and Julian Gaspar (415/622-5736)

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"KUWAIT PETROLEUM CORPORATION:
NEW HORIZONS FOR NATIONAL OIL COMPANIES"

Presented by
Hani A. Hussain
Assistant Managing Director
Kuwait Petroleum Corporation
Kuwait

At
The Sixth Annual
International Oil and Gas Markets Conference
September 27-29, 1987
Calgary Convention Centre
Calgary, Alberta

"KUWAIT PETROLEUM CORPORATION: NEW HORIZONS FOR NATIONAL OIL COMPANIES"

Presented by

Rani A. Hussain
Assistant Managing Director
Kuwait Petroleum Corporation
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It gives me great pleasure to address you today to talk about Kuwait Petroleum Corporation as one of the national oil companies in an oil exporting country, and try to shed some light on our background, operations strategies and our hopes for an international environment of co-operation amongst us all.

The process of state control over the production of oil in the exporting countries surfaced during the 60s. And by the late 70s, this process appeared to have been largely completed with only few exceptions. The basic drive behind this phenomenon was the acquisition of ownership by the producer countries, whereby they, rather than remaining a tax and royalty collecting entity, could partake a direct role in the marketing of oil in order to reap full benefit of their production by recovering unshared prices, profits and economic rent to finance development of their economies. They needed to exercise effective state control over production to keep it at a level consistent with their development requirements and also to conserve their depletable resources.

The state oil companies that emerged had varying responsibilities. The formation of Kuwait Petroleum Corporation (KPC) in 1980 was a part of this process. The difference however was that KPC was conceived as a fully integrated oil company encompassing all facets of oil operations and took over the charge of already well established specialised companies that came into being during the transitional period to operate in their respective field.

The world witnessed a gradual transition in the oil scene in the past decade and a half or so. The oil market which was dominated by multinational oil companies, saw the emergence of the producing countries through their oil companies. Multinational oil companies lost their equity production in major oil producing regions and were relieved of a major part of their pivotal role. However, this transition has not been easy or without pain for the national oil companies in so much as that there was an about turn in the market environment they confronted upon taking over charge. The perceptions of shortages raised by the oil crises of 1973 and 1979 gave way to a state of sustained surpluses with resultant implications of soft markets and relentless pressure on prices.

The legacy of this transitory phase, therefore, is one of fundamental changes in structure, supply/demand and price setting mechanism in the market which is all well known. As a result of this metamorphosis in the oil scene, some of the challenges faced by the National Oil companies, being new to the game, were severe if not insurmountable. I shall dwell on them briefly.

Firstly, Weak Demand:

I do not think I need to go into detail about this subject, but suffice it to say that during the 70s, OPEC production remained at levels well above 25 million Bbls/day. In the 80s it has been pushed down to around 15 million Bbls/day.

Secondly, Volatile Prices

In a perennially soft market characterised by instability and speculations, spot prices have assumed new importance and an enhanced role in setting contract prices. With surprises abounding, spot prices are the first to go haywire leading to unprecedented volatility in the market.

Thirdly, Revenues:

National oil companies are the single most important revenue earners in most oil exporting countries. The majority of the oil producers and exporters are developing countries, and their need for stable revenues is crucial for their development plans and their expectations of better future for their future generations. It is not uncommon to find in these countries projects abandoned for lack of funds at a great cost to their economies.

And Lastly, Economic Development

National Oil companies, while striving for a stable crude oil market, could not depend solely on crude oil sales for their well-being and refining crude oil merely for domestic needs. That would be travesty of the whole process. They thus have to look for more value added avenues, which are obviously available in the shape of refining oil for exports, with marketing of products and marine transportation as integral activities, to be followed by downstream acquisitions. Petrochemicals manufacture and marketing comes next as a complimentary activity.

Emergence of KPC

(Overhead 1) KPC, as one such organisation, is a part and parcel of this transition. It has been conceived as an organisation which would set for itself efficiency and performance criteria worthy of a multinationals. We thus set for ourselves well defined and clear objectives to justify our aspirations.

- Stabilise the long term inflow of oil revenues.
- Maximise the generation of oil revenues (within the constraints of the OPEC and our statutory production limits)
- Diversify the sources of Hydrocarbon revenue.

KPC has actually been formed as a result of restructuring of oil sector. As stated earlier, Kuwait oil sector already had well established public companies looking after specific functions like exploration, refining, transportation and petrochemicals. It thus had a ready made pool of know how and expertise. As the companies which were brought under the banner of KPC, were operating pretty independently with public ownership as the only link, what was needed to implement government policy was to set up an integrated corporation under the aegis of which a massive, well coordinated expansion program would take shape as well as get implemented and operated.

A single umbrella corporation was also needed to diversify into new geographic areas and new product lines in logical sequences to realise added value of Kuwait mineral resources. With the establishment of KPC these aims were realised. The systems and methods in KPC allow easier flow of information and co-ordination laterally and vertically and top management guidance is available at each critical step.

In order to carry out the functions entrusted to KPC, it has worked vigorously since its inception and in all modesty not without success.

Projects

KPC is carrying on an ambitious upgrading project for our three refineries that started at the beginning of this decade. The estimated cost of this complex and ancillary facilities is about U.S.$4.5 billion. Although, total refining capacity will not increase from the original 650,000 B/D, the refinery system's range and capability would be increased tremendously. It would afford great flexibility in operations that will make it possible to manufacture products to most stringent specifications that are expected to be required in the sophisticated markets of the West and Japan. When the work on all three refineries would be finished in 1988, many observers believe, it would rate as one of the most advanced refining complexes in the world.

Technology

A breakthrough in the acquisition of technology was accomplished by purchasing Santa Fe International that has afforded KPC access to considerable resources of technical know how and expertise in the field of drilling, production, refining, marine construction, pipeline laying amongst others. This has helped KPC in implementing major projects like Mina Abdullah Refinery single handedly without outside assistance. Furthermore, through the taking over of Santa Fe, KPC was able to expand its exploration activities worldwide. C F Braun, a division of Santa Fe, which specialises in the engineering, project management and construction of process plants, serves a number of industries ranging from petroleum refining, synfuels and petrochemicals not only in USA but around the world. Additionally, KPC has acquired exploration rights in some promising tracts in USA through the acquisition of Santa Fe.

Santa Fe also has affliates dealing in minerals, drilling and offshore construction.

As we have gained knowledge and expertise in the field of international exploration and consider that there are good opportunities and prospects in international exploration, KPC has established a specialised subsidiary called KUFPEC (Kuwait Foreign Petroleum Exploration Company)

Although KUFPEC has adopted a conservative approach to new exploration opportunies due to the overall depression in exploration activities worldwide, its activities have covered various countries such as China, Australia, Indonesia, Egypt and Tunisia.

Downstream

(Overhead 2) , (Slides 1, 2, 3) KPC has evaluated the pros and cons of entering downstream marketing carefully. The benefits which KPC anticipates in extending its operations downstream can be enumerated as follows:

- The development of long term and secure outlets for our crude oil and products.

- The earning of increased revenues from downstream vs the bulk markets, and in particular for specialised products, such as lubricants and Jet Fuels.

- Diversification from historic sales channels, geographic areas and slate of products.

KPC's entry into downstream marketing in Europe is one of our proudest achievements. It is a major step in accomplishing the overall objectives that I mentioned earlier, particularly for maximisation and diversification of oil revenues.

We had recognised quite early that merely struggling to maintain crude oil volume of sale or bulk marketing of few products, would confront KPC with handicaps that would impose unacceptable grave limitations on Kuwait's growth potential. We were thus never satisfied with just selling bulk and always conceived reaching further and further down to our final customers outside Kuwait as our goal, be it a service station or a factory running on oil.

The studies conducted by us in 1979 and 1980 on world oil supply/demand and situation analyses had broadly pointed out areas of potential growth and interest to us. The formation of KPC in 1980 provided means to materialise these goals gradually and effectively and purely based on commercial viability.

We are now marketing more than 250,000 B/D of oil in seven European Countries, and have cause to be satisfied with it. We are happy that our operations in Europe are run efficiently. We believe we have been quite innovative too in our marketing approach. According to several press reports in reputable publications and even by the admission of our competitors, we have remained responsible and professional in this rather new field for us. On the screen you can see the countries we are presently serving and KPC's relevant retail market share.

In the summer of 1986, KPC introduced Q8 as its brand for its downstream operations worldwide. The introduction of this brand was a major event throughtout our European operations and was the first launch of a major new entrant in the oil market in two decades. The following three slides show some of our facilities in Europe carrying our new logo.

We have resolved to consolidate further and improve on our performance. However, Europe is not the end of our ambitions. Our horizons are worldwide. We would like to participate in the developed world markets, besides other potentially attractive smaller markets in the developing world. KPC is prepared to make commensurate investments to become a major market force.

Conclusions

In the end let me conclude by saying that vertical integration and internationalisation expanded the horizon and effectiveness of our organization and enabled us to understand markets better in order to provide more efficient and economical service to our customers and consumers.

As a national oil company we seek developed world's understanding and appreciation in allowing us to cater for its energy needs through our presence in its downstream markets. We also hope to be allowed to export crude oil, petroleum gas and products unhindered by excessive taxes and restrictions. We believe the free flow of international trade is the best vehicle for the growth and prosperity for us all. And while our countries serve as markets for a wide range of goods and services provided by the developed world, most of the oil producing countries rely primarily on oil as an export commodity and hence what I said earlier is of paramount importance to us, and I believe, to the mutual interest of both the developed and developing countries. There is no reason why this reciprocity should not work to our mutual benefit. Therefore, in the interest of promotion of international trade and the continued growth, let the markets and the trade channels remain open with minimum taxes, curbs and restrictions.

Thank you.

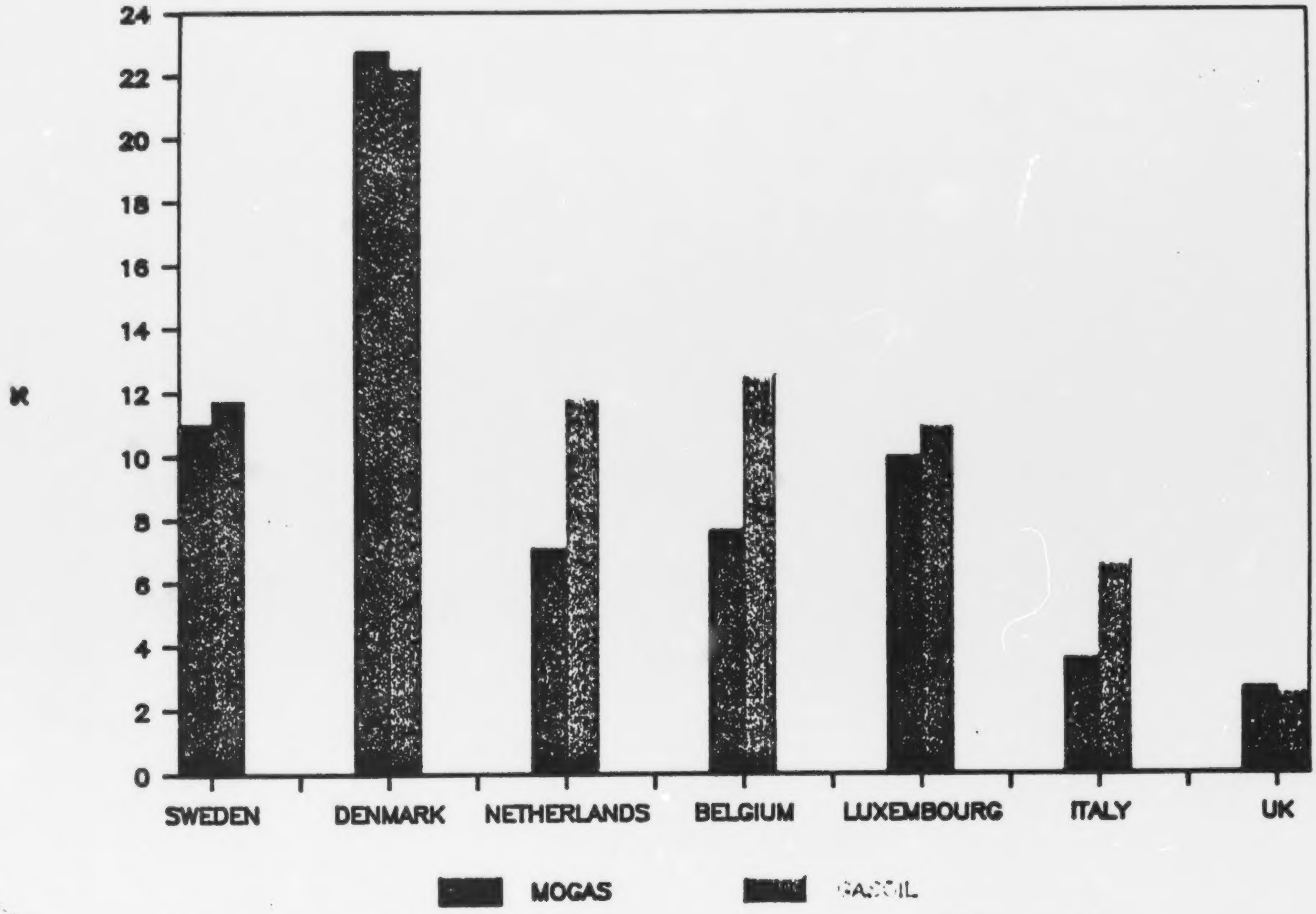
OVERHEAD (1)

KPC OBJECTIVES

- STABILISE THE LONG TERM INFLOW OF OIL REVENUES.
- MAXIMISE THE GENERATION OF OIL REVENUES (WITHIN THE CONSTRAINTS OF THE OPEC AND OUR STATUTORY PRODUCTION LIMITS).
- DIVERSIFY THE SOURCES OF HYDROCARBON REVENUE.

OVERHEAD (2)

MOGAS&GASOIL RETAIL MARKET SHARE—EUROPE



THE WORLD OIL MARKET:

CURRENT SITUATION AND MEDIUM-TERM OUTLOOK

A Middle East Perspective

by

Ali Mohammed Jaidah

The Sixth Annual International Oil
and Gas Markets Conference

Calgary/Alberta
September 27-29, 1987

I have been asked, according to your program to address the current situation and medium-term outlook of the world oil market from the Middle East perspective. You are all aware that day-to-day development in that area exert an overwhelming influence on world oil prices and the international energy scene as well as on world political situation. Indeed what is happening today in the Middle East affects the current situation in the world and will determine the future for many years to come. More than half of the world oil reserves are in the Gulf region and the Middle East is a strategically important area because of its location between Asia and Europe and its proximity to the Soviet Union.

In preparing this twenty-minutes talk, on such a wide and complex subject, I recalled the remark of Woodrow Wilson. You may remember that he said he required two full weeks to prepare a ten minutes speech, one week for a one-hour presentation but for a two-hour talk "I am ready now". I wish I had more time but I must admit that the organizers of this conference gave me plenty of notice for this engagement.

My problem is compounded by the fact that you expect me to say something about the future. An observer of forecasts about oil made over the last many decades will find they have one thing in common; they were all wrong.

Talking about the future is indeed a hazardous and complex task, especially in my part of the world and I am tempted to follow the advice of this ancient Greek philosopher who said in the fifth century B.C. "the future, you shall know it when it has come, before that, forget it". I will not, however, follow this advice entirely but I shall present to you what I consider the most important factors that are shaping the current and the immediate future of the oil industry. But first let me start with the current situation.

The Current Situation

After the December 1986 OPEC Geneva Agreement which put an end to last year's great price crash, we were all pleased to see a prompt recovery in world oil prices which have stabilized for a while at the new reference price of $ 18/barrel targeted by OPEC. The development of the last few months have revealed, however that this stability is very precarious. In fact, it is becoming clearer every day that OPEC's problems at $18/barrel are basically not different from those it faced a couple of years ago at $28/barrel.

On the demand side, after the million barrels per day (MMBD) or 2% increase recorded in 1986 at the world level, oil consumption appears to be depressed again and is generally believed to be growing this year at only half the rate recorded in 1986. Most of the surge in last year's oil demand is therefore transient in nature and this confirms the now widely accepted view that the price elasticity of oil demand is extremely limited over the short to medium term and that the major influence on demand is clearly the rate of economic growth.

On the non-OPEC supply side, things have not really changed either. At the aggregate level, non-OPEC crude oil and NGL's production together with net CPE exports, which was held last year broadly at the same level as in 1985, are now increasing again. The drop in U.S. production is being more than offset by increases elsewhere in spite of the voluntary production restraint observed by a few non-OPEC producers whose cooperation appears to be rapidly fading. Here again the new price level does not seem to inhibit the development of non-OPEC supplies.

As a result, the residual demand for OPEC oil, net of inventory change, continues to be depressed and is far from reaching the levels anticipated by OPEC last year. It will probably average 17.5 MMBD this year as compared to the 16 MMBD level reached in 1985. In other words, OPEC has achieved, at the global level, a 10% volume increase for a price decrease of 35% in nominal terms and of some 50% real terms.

Nor this is the end of the story as there are several other features of the current situation which remind us of the pre-collapse days.

First: OPEC's current output is above residual demand. This is contributing again to high levels of world inventories and thus threatening OPEC's own price stabilization efforts.

Second: Several member countries continue to exceed their allowables at the expense of a few others.

Third: Iraq and Iran are still at war and the conflict continues to interfere with the workings and the decision making process of the Organization.

Fourth: Like in 1985, Saudi Arabia is reluctantly playing the role of swing producer and is being placed in an untenable situation.

Under these conditions, I found it difficult to be optimistic about the short-term crude oil market outlook and you don't have to be an expert to foresee the outcome of such a situation. In fact, I believe that the conditions prevailing today are much more critical than those we have lived through in the pre-collapse days simply because OPEC constraints as a result of a drastic cut in their oil revenue.

The short-term outlook is therefore, I am afraid, for continued price volatility and no one can predict today the extent of the expected price fluctuations. As long as a huge excess capacity persists in OPEC, and particularly in the Middle East, and as long as the war continues between two important members of the Organisation, don't look at supply/demand forecasts to assess the market situation. It is a waste of time. By far, the most relevant factors determining the world oil market today are the ability of producing countries to restrain their production level, the levels of stocks, Saudi Arabia's willingness to play the role of residual supplier, and the evolution of the conflict between Iraq and Iran.

I shall return to some of these issue in a moment after reviewing with you the medium-term outlook.

The Medium-Term Outlook

On the demand side, as I said before, the rate of world economic growth remains the primary factor. It is now evident that lower prices have not stimulated this growth to the extent anticipated in 1986.

Since most economists expect worldwide GNP growth to remain sluggish in the near future, I do not expect world requirements to expand rapidly during the period up to 1990, almost irrespective of price considerations. To a great extent, this lack of price responsiveness is a reflection of the embedded conservation, improved energy efficiency and irreversible fuel substitution that has occurred under past higher prices. As a result, world oil demand is not expected to rise at a rate higher than 1%, even if prices were to remain at current levels.

On the supply side, the effect of the 1986 price decline will equally be very limited in the medium term. At the aggregate level, non-OPEC supplies are expected to remain quite stable during the period up to 1990. Crude oil and NGL production will show perhaps a marginal decline with the decrease in the U.S.A. and the U.K. sector of the North sea partly offset by increases in other regions such as Colombia, Syria, Yemen and the Norwegian North Sea sector. As for the CPE's, in view of their foreign earning requirements, their exports should be expected to run at least at the current level, even if domestic production falls.

So, no relief is in sight for OPEC. The combination of marginal increases in oil demand and relatively stable non-OPEC supplies will likely result in very limited growth in required OPEC crude oil production for the rest of the eighties. OPEC's output will therefore remain constrained for several years to come before it reaches the minimum comfortable level generally estimated at some 20 MMBD.

Under these circumstances, OPEC cannot hope to obtain the oil revenues required for the economic development of its member countries through growth in oil export volumes. The only option is to try to raise the price of oil, or at least to stabilize it, through a rigorous regulation of production. Recent experience shows that OPEC, on occasions, can implement this policy; but that on other occasions member countries seem to lack the necessary discipline. Accordingly I predict that this same pattern of behavior will continue until such a time, perhaps in the late 1990's, when the excess capacity in oil production will be reduced. This means that oil prices are likely to remain very volatile until the late 1990's.

Implications of the Middle East Situation

Let me now return to the two critical issues of the role of Saudi Arabia and the potential impact of the Iraq/Iran conflict on world oil markets.

First, the role of Saudi Arabia. As a result of the massive stock built which took place this summer, demand for OPEC oil will slacken again and, sooner or later, the market will deteriorate once more. Most oil producers, both OPEC and non-OPEC, make the assumption, either explicitly, or implicitly, that Saudi Arabia will (some say "should") act again as the swing producer because it has both the technical and financial flexibility to perform this function which they believe Saudi Arabia cannot afford to abandon for a variety of political reasons.

The events of 1986 show that Saudi Arabia's willingness to act alone as a residual supplier cannot be taken for granted. No great comfort should be derived from the fact that Saudi Arabia played again this role in January and February 1987 when the market tried to test OPEC's determination to hold fixed prices. The circumstances were exceptional because Saudi Arabia had just led OPEC back to the fixed price policy and because OPEC countries, with some minor exceptions, were not exceeding their quotas. OPEC and non-OPEC countries would be gravely mistaken if they continued to assume that Saudi Arabia is prepared to act alone as swing supplier in all circumstances. So, do not take Saudi Arabia's willingness or ability to play the swing supplier role for granted.

Before I conclude this presentation, I would like to make some reference to the Iraq/Iran war which dominates so much the current situation. Let me speculate about the implications of the Gulf war with the help of three different scenarios.

The first scenario is one of a dramatic escalation of the conflict with so much disruption to navigation that, for a while, little oil will come out through Hormuz. Such a disruption will of course cause a price flare up. But soon after the shock, the consuming world will adopt policies that will reduce further its dependence on oil. In any case, a total disruption of oil supplies through Hormuz which will inevitably cause chaos and disruption at the beginning, could be managed after a while with a bit of careful planning. Today, some 8.1 MMBD pass through Hormuz. Part of this volume could be compensated for by diverting supplies through Saudi pipelines to the Red Sea and another part by additional production from Nigeria, Libya, Venezuela, all of which have considerable excesses of productive capacity. The final deficit may be as little as 2.4 MBD, and this could be met by drawing down stocks (including strategic) which could provide this amount for a continuous period of eighteen months.

In the long term, all the Gulf countries, including Iraq and Iran, would suffer from the consequences of such a disruption. I still remember the days when the world and particularly the U.K. Government thought that it would be impossible to do without the Suez Canal. Anthony Eden lost his sleep, then his health, then his job worrying about the Suez Canal, "the jugular vein of the Empire". The canal was blocked in 1956 and ways were quickly found, through the developments of VLCC's to do without the Suez Canal. When it was blocked again in 1967, nobody took much notice. The Suez Canal had been forgotten. Since the early sixties, nobody has been losing sleep over it. Nobody considers it indispensable. There is a lesson in that, a lesson which may surprise you. The Gulf, which so many today consider indispensable, could be forgotten as quickly and as surely as the Suez Canal. I leave it to you to think about the economic and political consequences of this situation for the people and the countries of the Gulf.

The second scenario is one of a protracted crisis which will worry the market intermittently but will not cause a major disruption. Such a crisis would increase the volatility of oil prices, albeit at a relatively high level, and encourage a stock build-up. It would re-create for the late eighties the weak conditions which prevailed in 1981-1986 after the crisis of 1979-1980. OPEC can still prevent this from happening by the simple device of tightening now its production control. I maintain that a temporary rise in price, so long as it remains temporary, is less harmful to the long-term interests of OPEC than a big stock build-up. As always, there is an urgency in the implementation of this message which is well understood by all OPEC member countries, but which most countries, each for its own reasons, chooses to ignore or ask to be excused.

The third scenario is a rapid end of the war through a peaceful settlement. This is the outcome we should all wish for the sake of both Iraq and Iran and for the sake of the region. Peace has its costs. It requires concessions from both sides. I believe, however, that the benefits are immense and outweigh these costs. Contrary to a common view, peace need not result in over production of oil and weakening of the market. The notion that, as soon as the war ends, Iraq and Iran will engage in an oil production race in order to obtain revenues needed for the reconstruction of their countries, is mistaken. This view assumes that neither Iraq nor Iran have a correct grasp of the relationship between over production and oil prices, and of the impact of a price collapse (the necessary result of over production) on revenues. In my view, peace will have different effects. It will enable OPEC members to agree more easily than hitherto on policies which stabilize the market in their mutual interest.

Conclusions

There is no doubt that the Middle Eastern countries play a crucial role in the world petroleum market. They have enormous hydrocarbon reserves and they can produce large quantities of oil at very low extraction costs. They are both the influential and the swing producers of crude oil for the world. In principle the Middle Eastern oil exporting countries have potentially the forces to regulate and stabilize the world petroleum market.

I have argued, however, that the present circumstances are not favorable for the performance of this role. The volume of oil demand is so low as to cause much productive capacity to remain unutilised in all OPEC countries, particularly in the Middle East and the Gulf. The medium term demand outlook is not very bright either; and this suggests that excess capacity will persist for many years to come, at least until the mid 1990's if not later. The existence of excess capacity induces exporting countries to over produce, and this weakens OPEC's ability to stabilize the market. Saudi Arabia, the country with the largest production and the largest reserves, is no longer in a position to act continually as a swing producer. Yet, OPEC cannot function effectively unless a few important countries take the leadership and perform the essential role of residual suppliers. Furthermore, the political situation in the Middle East is a major factor of instability. There is the Iran/Iraq war which can cause prices to flare-up on certain occasions, but which complicates also OPEC's task in deciding on, and implementing, stabilization policies. There is also the Arab/Israel conflict which has been overshadowed by the Gulf war, but which can still cause major accidents on the Middle Eastern front. The conclusion, is that the Middle East which in normal circumstances could be a formidable force for stability in petroleum affairs, ~~and~~ is likely to be for many years to come a factor of instability and of price volatility.

PRELIMINARY

OUTLOOK FOR DEMAND GROWTH IN ASIAN COUNTRIES

Presented by

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OUTLOOK FOR DEMAND GROWTH IN THE ASIAN COUNTRIES

1. In this paper Asia is defined as countries south of the Soviet Union but excluding countries in Iran and the industrialised countries of the Pacific (Australia, New Zealand and Japan)

2. In considering the outlook for demand of hydrocarbons (oil & gas), an attempt has been made to consider separately the outlook for demand of primary energy and the demand of hydrocarbons for the production of chemicals.

DEMAND OF PRIMARY ENERGY

3. Accurate data on past and present consumption of primary commercial and non-commercial energy are not readily available and such data as is provided by various agencies (UN, IEA, ESCAP & WEC) show a number of inconsistencies and omissions. Thus these data exclude animal draught power and underestimate, often seriously, the consumption of non-commercial energy sources such as fuel wood, crop and animal wastes (for instance the Indian field studies showed that in 1982 the consumption of fuel wood, crop and animal wastes were almost 100 MTOE; the IEA Energy Balances show this at 76 MTOE); these play a specially significant role in energy balance of most countries in Asia. It has to be accepted that

many of the countries in Asia do not themselves possess reasonably accurate estimates of consumption of non-commercial energy sources.

4. In analysing trends in consumption of primary energy, the Energy Balances provided by the International Energy Association supplemented by data in the IBRD World Development Reports and reports of ESCAP have been utilised but the caution in the preceeding paragraph (about the probable underestimation in the consumption of non-commercial energy) must be noted. (Unfortunately these Energy Balances extend to 1982; the Balances for more recent years are expected to be published shortly).

5. Nine countries in Asia - Bangladesh, India & Pakistan in South Asia; Indonesia, Republic of Korea, Malaysia, Thailand & the Philippines in South East Asia; and China in the Centrally Planned Asian countries, account for well over 90% of Asia's consumption of primary commercial and non-commercial energy of 956 MTOE in 1982; of this at least 311 MTOE is contributed by fuel wood, crop and animal wastes. Energy consumption in these countries was about 60% of the total energy consumption in Western Europe and twice that in Latin America. Growth between 1973-1983 was faster than in any other region except Africa and substantially larger than in Japan and Western Europe.

[illegible]. The total GDP of these nine countries grew from US 1980 $ 556.2 billion to 1980 US $ 760.3 billion in 1985, on average annual growth rate of 6.45% per capita GDP in 1985 ranged from 1980 US $ 160.14 in Bangladesh to 1980 US $ 2004.48 in Malaysia and 1980 US $ 2096.84 in the Republic of Korea.

Gross domestic savings and gross domestic capital formation varied as shown in Table 3.

6. The domestic consumption of primary energy in these ninecountries is set out in Table 4. Several Asian countries have suffered and continued to suffer a shortage of electricity which in turn has affected the rate of growth of their economies. So the primary energy consumption does not reflect the genuine demand.

[illegible]. There are a number of inter-regional variations which are analysed in table 5.

Table 1 : Gross Domestic Product and average annual growth rate of GDP

	GDP in '000 million 1980 US $		Average annual growth rate - %
	1980	1985	
South Asia			
Bangladesh	13.5	16.1	3.6
India	136.4	175.7	5.2
Pakistan	21.1	28.2	6.0
Sub-total	171.0	220.0	
Soiuth East Asia			
Indonesia	72.8	86.5	3.5
Malaysia	23.9	31.3	5.5
Republic of Korea	58.9	86.2	7.9
Philippines	33.4	32.6	- 0.5
Thailand	29.8	38.2	5.1
Sub-total	218.8	274.8	
Centrally Planned Asia			
China	166.4	265.5	9.8

Table: 2 Gross Domestic Product per capita and its average annual growth rate

	GDP per capita in 1980 US $		Average annual rate of growth in per capita GDP - %
	1980	1985	
South Asia			
Bangladesh	152.22	160.14	1.02
India	198.96	229.65	2.91
Pakistan	256.67	293.55	2.72
South East Asia			
Indonesia	499.18	533.10	1.32
Malaysia	1694.48	2004.48	3.72
Republic of Korea	1549.03	2096.84	6.23
Philippines	688.44	595.80	- 2.85
Taiwan (Tappei)			
Thailand	636.91	739.65	3.04
Centrally Planned Asia			
	169.87	255.24	8.48

Table 3: Gross Domestic Savings & Gross Domestic Capital Formation

	Gross domestic savings as % of GDP		Gross domastic capital formation as % of GDP	
	1980	1985	1980	1985
South Asia				
Bangladesh	2	3	17	13
India	20	21	23	25
Pakistan	6	5	18	17
South East Asia				
Indonesia	30	32	22	30
Malaysia	32	33	29	28
Republic of Korea	23	31	31	30
Philippines	25	13	30	16
Thailand	22	21	27	23
Centrally Planned Asia				
China	30	34	31	38

Table 4 : Domestic Consumption of Primary Energy in million tonnes oil equivalent

1- Coal & brown coal
2- Oil & gas
3- Hydro, Nuclear, Thermal
4- Non Commercial Energy

all figures in MTOE
(all figures in nearest million tonnes oil equivalent)

	1973				1979				1980				1982			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
South Asia																
Bangladesh	-	1	-	3	-	2	-	3	-	3	-	3	-	3	-	4
India	40	22	10	61	54	28	15	72	55	28	15	72	60	32	15	76
Pakistan	1	6	2	5	-	9	3	6	1	11	3	7	1	14	3	7
Sub-Total	41	29	12	69	54	39	18	81	56	42	18	82	61	49	18	87
South East Asia																
Indonesia	-	13	1	37	-	30	1	43	-	26	1	44	-	31	1	38
Republic of Korea	8	14	-	19	13	26	2	21	14	27	2	21	17	24	2	21
Malaysia	-	5	-	3	-	7	-	4	-	10	-	4	-	13	1	4
Thailand	-	7	1	5	-	9	1	13	-	10	1	12	1	11	1	15
Philippines	-	10	1	9	-	12	1	11	-	12	2	11	-	11	2	12
Sub-Total	8	49	3	73	13	84	5	92	14	85	6	92	18	90	7	90
Centrally Planned Asia																
China	211	54	3	98	305	98	4	132	297	85	5	130	320	76	6	134
TOTAL :	260	132	18	240	372	221	27	305	367	212	29	304	399	215	31	311

Table 5: Changes in Inter-Regional Consumption of energy

Figures in MTOE
Figures in brackets represent average annual growth rate.

	1973	1979	1979	1982
Total primary energy consumption of the nine countries.	+275	(6.06)	+306	(1.1)
Total PEC of 3 S.Asian countries	+ 41	(4.08)	+ 23	(3.84)
total PEC of 5 SE Asian countries	+ 61	(6.49)	+ 11	(1.85)
total PEC of China	+173	(6.66)	- 3	-(0.18)
Total Energy Consumption of coal of nine countries.	+112	(6.15)	+ 27	(2.36)
total coal consumption of 3 S.Asian countries	+ 13	(3.11)	+ 7	(4.15)
total coal consumption of 5 SE Asian countries	+ 5	(5.54)	+ 5	(11.45)
total coal consumption of China	+ 94	(4.18)	+ 15	(1.61)
Total Oil & Gas energy consumption of nine countries	+ 89	(8.97)	- 6	-(0.91)
total oil & gas energy consumption of 3 S.Asian countries	+ 10	(5.06)	+ 10	(7.90)
total oil & gas energy consumption of 5 SE Asian countries	+ 35	(9.4)	+ 6	(2.33)
total oil & gas energy consumption in China	+ 44	(10.44)	- 22	-(8.12)
Total energy consumption of hydro, geo-thermal & nuclear energy	+ 9	(6.99)	+ 4	(4.71)
total (h,g,n) consumption of 3 S.Asian countries	+ 6	(6.99)	-	-
total (h,g,n) consumption of 5 SE Asian countries	+ 2	(8.89)	+ 2	(11.87)
total (h,g,n) consumption of China	+ 1	(4.91)	+ 2	(14.47)
Total Non-Commercial Energy consumption of nine countries	+ 65	(4.07)	+ 6	(0.65)
total (NC) consumption of 3 S.Asian countries	+ 12	(2.71)	+ 6	(2.41)
total (NC) consumption of 5 SE Asian countries	+ 19	(3.93)	- 2	-(0.73)
total (NC) consumption of China	+ 34	(5.09)	+ 2	(0.50)

6.1 The energy intensity in 1985 and elasticity of consumption of primary commercial energy (1980-1985) is set out in Table 7.

Table 7: Energy Intensity and Energy Elasticity

S. Asia	Energy intensity kg OE/GDP(1980 US$)	Energy elasticity 1965-80	Energy elasticity 1980-85
Bangaladesh	0.25	-	2.11
India	0.77	1.52	1.23
Pakistan	0.78	0.63	1.57
S.E. Asia			
Indonesia	0.37	1.06	1.26
Republic of Korea	0.67	1.27	0.63
Malaysia	0.49	0.94	1.40
Thailand	0.41	1.41	1.29
Philippine	0.48	1.01	(–)
Centrally Planned Asia			
China	1.92	0.58	1.53

The specially high energy intensity per 1980 US $ (GDP) in China arises from the high requirement of space heating. Apart from this both the nature & extent of industrialisation as well as the energy efficiency in industry are important factors. India & China both have energy intensive industrial manufacture. Energy conservation through greater efficiency in use has been specially effective in reducing energy intensity in the Republic of Korea, Thailand, and the Philippines. Similar efforts have progressed in China and are beginning to start in other countries.

6.2 The share of oil & gas in primary energy consumption and primary commercial energy consumption are set out in Table 6.

Table: 6. Share of oil & gas & energy Imports as percentage of Energy Imports

	% Share of oil & gas in primary energy consumption			% share of oil & gas in primary commercial energy consumption			Energy imports as % of merchandise exports
	1973	1979	1982	1973	1979	1982	1985
South Asia							
Bangladesh	25	40	43	100	100	100	41
India	17	18	17	30	29	30	30
Pakistan	43	50	56	64	73	75	52
South East Asia							
Indonesia	26	42	44	99	97	97	12
Republic of Korea	34	42	39	64	63	56	24
Malaysia	63	64	72	100	100	93	--
Thailand	53	39	39	88	90	85	33
Philippines	50	50	44	91	92	85	44
Centrally Planned Asia							
China	15	18	14	20	24	19	--

The share of hydrocarbons in the total primary energy consumption between 1973-1982 increased in Bangladesh, Pakistan (a substantial part of the increase is due to increased consumption of domestic gas), Indonesia, Korea & Malaysia; the share in India & China declined slightly and more pronouncedly in Thailand and the Philippines. Both Indonesia & Malaysia are large oil producers and Malaysia a substantial exporter but China though it is an exporter curbed the consumption of hydrocarbons by substituting it with domestic coal.

Between 1979 and 1982 the share of hydrocarbons in primary commercial energy consumption decreased in the Republic of Korea, Thailand, the Philippines and China. It remained virtually unaltered in India; in this period the domestic production of oil & gas in India increased sharply.

7. The share of major sectors in primary energy consumption in these countries and changes in this has been analysed by a number of energy specialists. The main features of particular importance in the consideration of outlook for energy demand and the share of hydro-carbons in this are as follows:

> energy intensity in industry is beginning to show a decline resulting from efforts at increasing the efficiency in use. There is also some rethinking on new investment in highly energy intensive industrial manufacture and at any rate the pace of this is likely to be slower than in the past;
>
> energy intensity in transportation is declining through the introduction of more fuel efficient vehicles but this is countered to an extent by an increase in the number of vehicles, the rate of which is substantially higher than in the past; this increase is specially large in two wheelers (motor cycles and scooters). The share of the transportation sector is primary commercial energy consumption in China is exceedingly small;
>
> there is some evidence that energy intensity in agriculture is increasing due to lift irrigation, land shaping through tractors, mechnical threshers and in post-harvesting operations; to an extent this is countered by increasing efficiency in use through the use of more energy efficient systems though the pace of this is likely to be slower than in industry;

there is also evidence that the consumption of commercial energy is increasing among the poor, specially the rural poor, who have been overwhelmingly dependent on non-commercial fuels for their cooking and heating requirements. Many Asian countries have special and large programmes that will enable a more rapid alleviation of poverty than in the past and this accelerates the substitution of non-commercial fuels by commercial fuels specially by liquid hydro-carbons such as kerosene which is deliberately low priced in a number of Asian countries. To an extent this increasing demand for fuels is sought to be met by increasing emphasis on afforestation and special fuel forests but the progress on this is uneven specially in Asian market economies due to land ownership problems. However a large number of more energy efficient cooking stoves have been developed and these can double the thermal efficiency; their introduction is somewhat slow but shows signs of accelerating;

there is increasing concern that the large consumption of non-commercial fuels - fuel wood, crop and animal wastes, in cooking and heating has led to severe erosion and degradation of land. In several countries the quantum of fuel wood utilised in cooking is double the correct sustainable average annual increment of existing forests. Moreover the utilisation of crop and animal wastes in cooking and heating deprives the soil of important nutrients and results in loss in soil fertility. The cost of restoring soil fertility by the addition of chemical and bio-fertilisers is much higher than the use of crop and animal wastes. Recent trends in a number of countries indicate a rapid increase in the price of fuel wood, crop and animal wastes.

8. The availability of domestic energy resources play a crucial role in determining the share of each energy source. Here too there are conflicting data.

Figures in MTOE

	oil	gas	coal	hydro
South Asia				
Bangladesh	-	400		
India	600	500	16000 (75000)	51
Pakistan	NA	500		
South East Asia				
Brunai	200	200		
Indonesia	1100	1400	2000	
Malaysia	400	1400		
Centrally Planned Asian Countries				
China	2400	800	66000 (96000)	280

(figures in brackets represent total probable reserves)

Recent exploration activities suggest that these estimates of reserves of oil, gas & coal may be consertive. Intensive exploration of hydrocarbons & fossil fuels in many Asian countries received a particular impetus in the early 1930s: currently oil exploration activities show some signs of daceleration in Asian oil exporating countries.

PROJECTIONS OF ENERGY DEMAND

9.1 Several Projections have been made of the demand of energy in Asia and these are summarised.

Projections of World Energy Conference, Conservation Commission-Energy 2000-2020: World Prospects and Regional Stresses.

These Projections deal with two scenarios, normative cooperation(1) and increased tensions (z) as follows:

figures in MTOE

South Asia (Afghanistan, Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan, Sri Lanka)

	Year 2000		Year 2000	
	(1)	(2)	(1)	(2)
Coal & brown coal	96	89	165	166
oil	81	38	102	28
gas	16	9	15	5
hydroelectricty	31	35	53	59
nuclear energy	22	15	55	33
new sources	-	12		41
total primary commercial	257	198	419	332
total non-commercial	218	257	279	362
total primary energy	475	455	698	694

South East Asia

(Brunei, Burma, Fiji, Hongkong, Indonesia, Macao, Malaysia, Papua-New Guinea, the Philippines, Singapore, Republic of Korea, Taiwan, Thailand & Islands in the Pacific).

total primary non-commercial energy	204	231	237	315
total primary energy	1937	1479	3374	2263

Jayant Sathaye & Bevan Mayars (Lawrence Barkely Laboratory)- Energy Demand in Asian Developing Countries: Historical Trends & Future Prospects (excluding China)

figures in MTOE

	Asia excluding China				China*	
	2000		2010		2010	
	(1)	(2)	(1)	(2)	(1)	(2)
total primary commercial energy	345	472	520	646	1487	1667
of which oil	219	344	375	501	NA	NA

From *Win zong xin - The Effects of Energy Policies on Demand Management figures in MTOE

	Year 2000		Year 2020	
	(1)	(2)	(1)	(2)
Coal & brown coal	39	47	59	71
oil	255	168	370	201
gas	38	34	96	61
hydroelectricity	19	21	69	77
nuclear energy	47	33	130	80
new sources		17		55
total primary commercial energy	410	320	767	545
total primary non-commercial energy	151	171	170	227
total primary energy	561	491	937	772

Centrally Planned Asian Countries - China, Kampuchea, Laos, Mongolia, N.Korea & Vietnam.

figures in MTOE

	Year 2000		Year 2000	
	(1)	(2)	(1)	(2)
Coal & brown coal	1115	874	1828	1266
oil	444	226	679	252
gas	53	34	136	63
hydroelectricity	33	29	118	95
nuclear energy	53	35	219	97
new sources	35	50	157	175
total primary commercial energy	1733	1248	3137	1948

9.2 A few countries have prepared their own projections of energy demand. The projections for India are as follows:-

figures in MTOE

	Srivastava & Pachauri				Planning Commission Group
	Year 2000		Year 2010		2004
	(1)	(2)	(1)	(2)	
oil	104	96	129	118	136
gas	12	12	36	35	21
coal	168	161	227	218	241
hydro & nuclear	76	74	153	151	22
total primary commercial	360	344	545	521	420
non-commercial					191

Some of the other countries's projections are as follows:

figures in MTOE

	Pakistan (PAEC)		Indonesia	
	Year 2000	Year 2010	Year 2000	Year 2010
coal	6	11	13	29
oil	15	25	55	97
gas	14	20	33	48
hydro & grothermal	11	14	10	30
primary commercial	51	83		
primary non-commercial renewable		1		

9.3 Just the comparison of two these projections will show the extent of divergence; for instance for oil & gas

figures in MTOE

	Year 2000	Year 2010
South Asia		
WEC	97/47	92/33
India & Pakistan which account for over 90% of S.Asian demand	137/145	198/210

9.4 Except for the projections of WEC, other projections have not attempted to estimate the contribution of new energy sources. A number of solar thermal, solar-electric and wind energy systems have been installed in several Asian countries. In certain situations these have proved cost effective and a number of Asian countries have established new organisations to carry out research, field studies and field analyses to clearly determine what these are and delineate their activity areas in the pattern of energy consumption. But what their contribution will be to the primary energy consumption is still unclear.

9.5 Detailed exploration for coal & thereafter its exploitation, erection of hydro-electricity generation stations and nuclear energy plants are capital intensive and also suffer from long gestation. Environment groups are growing rapidly in Asia and do not readily or quickly accept schemes without insisting on extensive investigation on environmental implications and how these will be reconciled with economic growth specially of the poor. Though the drive for self reliance and a high degree of self sufficiency in primary energy will continue, it does not appear probable that large scale substitution of oil & gas in energy by other sources can or will take place in the next 15 years. More probably the rate of growth of oil & gas consumption may slow down, albeit gradually, by greater conservation through improved efficiency in use of not only hydrocarbons but all types of energy consumed in industry, transportation, agriculture and in domestic use.

Naturally in all such 'predictions' it is assumed that the balance of payments that affects many Asian countries will not impose an insuperable problem andthat there will be no major long duration catastrophies.

DEMAND FOR OIL AND GAS IN PRODUCTION OF CHEMICALS

10. Few countries in Asia have prepared, at any rate published, projections of the manufacture of chemicals and feedstocks. Therefore the estimates presented here in the nature of first estimates.

The production of nitrogenous fertilisers in Asia in 1984-85 is estimated at 25 million tonnes of nitrogen. Some Asian countries have already announced plans to establish a further production capacity of 8.2 million tonres of nitrogen which should be commissioned in the next five years. The consumption of nitrogenous fertilisers in most Asian countries is still far lower than that of high consumption countries such as Japan, Korea, the Netherlands and Britain. A doubling of the present consumption in the next thirteen years appears not unlikely even after taking into account some diversion of animal wastes from cooking and heating to agriculture as well as the possibility of importing some quantity of nitrogenous fertilisers from oil & gas rich neighbouring regions.

It is fairly clear that in the foreseeable future, naphtha and natural gas will remain the preferred feedstocks. So the demand for naphtha & gas in Asia for the manufacture of nitrogenous fertilisers may well reach about 50 million tonnes by 2000.

11. The manufacture of other petrochemicals too is expected to increase in Asia. China has already emerged

as a substantial manufaturer. Taiwan,the Republic of Korea,Singapore & India are prominent manufacturers. India has announced major plans for more than trebling the existing manufacture in the next 5 years or so specially in the context of reserves of natural gas with a significant component of ethane and propane. Though data are scanty,the quantity of naphtha,ethane and propane that may be consumed in the manufacture of petrochemicals might reach 20-25 MTOE in 2000.

KEYNOTE ADDRESS

THE STATE OF THE WORLD OIL MARKET

Presented by

Sir Albert Thomas Lamb

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At

The Sixth Annual

International Oil and Gas Markets Conference

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Calgary Convention Centre

Calgary, Alberta

1.My brief from the Canadian Energy Research Institute, to whom, together with the Calgary Chamber of Commerce, I am grateful for the invitation to address this distinguished gathering and for the opportunity to visit Canada, asked me to discuss developments in the market since September 1986, the current situation and a one-year outlook.

2.When I received the Conference Brochure I saw that it proclaimed "8.45 am to 12 noon:Keynote Address on the State of the Oil Market". "Goodness" I said, being always polite to myself. But then I read on and discovered that five distinguished participants in the international oil industry were to follow me before 12 noon and that that you would have to listen to me for only 20 minutes......How disappointing!

3.If I follow my brief and look back over the past twleve months we see that there has been some change in the quantities of oil produced, consumed and traded.According to the BP Statistical Review of World Energy, World Oil production was 4.5% higher in 1986 at a shade over 60 million barrels a day of which 44.5 million barrels a day were produced in the Non-Communist World. World consumption rose by 2.5% to a shade under 60 million barrels a day whilst consumption in the Non-Communist World rose by 2.7% to 46.4 million barrels a day. The OPEC countries production jumped by 13.1% in 1986 as a result of the decision taken by its member countries in December 1985 to secure a larger share of the market.OPEC reintroduced quotas in August 1986, confirmed them in October 1986, and in December 1986 twelve of the Organisation's thirteen members, Iraq abstaining, agreed to reduce output of crude oil by about 1.5 million barrels a day to 15.8 million barrels a day for the first six months of 1987. The Organisation also agreed on a reference price of $18.00 a barrel. At a further meeting of OPEC in June 1987 the same twelve members, Iraq again abstaining, agreed to maintain the reference price of $18 a barrel while lifting the total of their quotas to 16.6 million barrels a day for the second half of 1987.

4.OPEC production has actually exceeded the agreed quota total since not every member of the Organisation has abided by its quota; Kuwait and Saudi Arabia do not appear to include in their quotas the 250,000 to 300,000 barrels a day they produce from their Shared Zone as "war relief crude", a form of financial aid in kind, for Iraq; and Iraq´s refusal to subscribe to any quota control of its production could produce an additional strain this year when the pipeline to Tukey´s south-east coast is completed and Iraq´s export potential rises to 2.5 million barrels a day:the OPEC quota allocated to Iraq,but not accepted by that country, is 1.54 million barrels a day. A rapprochement between Iraq and Syria, for which several Arab countries are working in the teeth of opposition from Iran, which wishes to retain Syria as its only friend in the Arab World, could lead to the reopening of the Iraqi oil pipeline to Syria´s Mediterranean coast, thereby raising Iraq´s oil export potential to between 3 million and 3.5 million barrels a day, twice its OPEC quota.

5.According to the Petroleum Economist issue for this month, September 1987,OPEC production during the first six months of this year averaged 16.5 million barrels per day of crude plus 1.2 million barrels a day of natural gas liquids. Such production is twelve per cent more than the agreed 15.8 million barrels a day. Repports in the press of OPEC production in July and August suggest that it has risen past 18 million barrels a day and may now be running at more than 19 million barrels a day.With non-OPEC production continuing at its 1986 level, there is now plenty of oil for everyone and perhaps to spare, with the result that the market priice of oil is back again around the $18 "reference" price fixed by OPEC after the short-lived increases to above $20 registered in the early Summer when United States naval intervention in the Gulf raised the specttre of a widenoing of hostilities in that region and a consequent reduction in the flow of oil out of the Gulf. What has happened so far has been the opposite: the intervention has enabled the Gulf producers to increase their exports above their OPEC quotas : for example, Kuwait´s United States-protected exports are said to have been running at 1.7 million barrels a day; and Iran took advantage of the lull in Iraqi attacks on its tankers to lift its production to a reported 3 million barrels a day. As the Gulf fills with Western warships protecting in one way or another the passage of oil-filled tankers out though the Straits of Hormuz, I find it difficult to envisage a situation short of suicide by Iran which would sustain a higher oil price. On the contrary,there is a danger of a weakening of prices if current over-production continues, if Iraq can make more use of its westwards-flowing pipelines, and if a United Nations-inspired cease-fire in the war between Iran and Iraq enables these two countries not only to increase or resume their oil exports by sea but also enables them to enter a post-war reconstruction phase for their petroleum industries. For the immediate future I would not discount the ability of OPEC in extremis to accept for perhaps limited periods the industrial and financial disciplines which a succesful return to quotas would demand.

6. I turn now to wider political circumstances surrounding the world oil market. Despite the indications in May, after the Iraqi attack on the USS Stark and United States agreement to reflag Kuwaiti tankers,that the United States Government was preparing to intervene in the Gulf, at their Economic Summit in Venice in June of this year, the seven Western industrial nations did not turn their attention to the security of oil supply as they had done at Tokyo in July 1986 when they declared in their communique, "Bearing in mind that the recent price decline owes much to the cooperative energy policies which we have pursued during the past decade, we recognise the need for continuity of policies for achieving long-term energy market stability and security of supply." OPEC oil, and particularly cheap-to-produce oil from around the Persian Gulf, is best placed to meet market requirements. Expensive-to-produce non-OPEC oil has security of supply attractions but its production is more vulnerable to price fluctuations in a volatile market which it does not control. In 1986, that difficult year for the North Sea oil producers when the price of Brent Blend fell from $26 a barrel in January 1986 to below $10 a barrel inthe Summer, my company, Britoil, an exploration and production company, had to reduce exploration expenditure by 46 percent, postpone other planned expenditure, cut its staff numbers by almost 50 percent and decide to dispose of its United States assets.

7. Britoil's experience was not unique and found its parallels throughout the intenational oil and gas exploration industry. The curtailment of exploration activities in the non-OPEC Western World renewed anxieties, which had lain largely dormant during the recent few years of over-supply, about the Western World's vulnerability to future disruptions of supply, meaning by this not only interruptions in the delivery of physical barrels but also the introduction of terms of trade difficult if not impossible to accept without detriment to the economic progress of the consuming countries of the Western World.

8. The industry is doing its best to mitigate the economic damage which over-reliance on a few sources of oil and gas could cause. In the North Sea, for example, the industry is pursuing its talent for solving problems, a talent I have always admired during my 30 years of working with, and recently in,the industry. For the past five years the North Sea oil industry has been seeking at 15 percent reduction in its costs. The fall in the oil price has given such an impetus to these endeavours that the cost of developing the Kittiwake field, a Shell/Esso venture announced in June 1987, will be some 40 percent lower than initial estimates of about £500 million (or $750 million). Britoil was able to bring our Clyde field into production this year at a cost of under £600 million compared with an original budget of £900 million. But the loss of income of $8 a barrel (from $26 to $18) must clearly have an impact on the amount of money available for E and P, as the decline in the number of wells drilled inthe North Sea illustrates: earlier this year the number of wells being drilled was down to 18 from 50 a year ago. But in August of this year 65 wells were drilled (19 exploration, nine appraisal and 13 development wells), drilling costs having dropped, according to a report in the London Times, to $12,000 a day for a rig compared with $25,000 a year ago. We can depend on the international oil companies to do their best, within the resources available to them, to find and produce the oil and gas to sustain their operations at the level of profit which will command the loyalty of their shareholders. As the E&P situation in the North Sea improves so does that of the offshore supply industry, which still has about 40 percent over-capacity. When I was in Aberdeen, Britain's oil capital, last week, I found that there is cautious optimism that the improvement in activity may be just enough to keep the supply companies going.

9. Returning now to the attachment of our Western democratic governments to the working of market forces, what is their attitude to this commodity, oil, which, during its hundred years or so of history, has shown itself to be the most politically-divisive commodity in trade?

10. On May 11 of this year, the 21 member countries of the International Energy Agency met at Ministerial, that is,the political, level for the first time since July 1985. They admitted in their communique that lower oil prices have created serious problems in the context of long-term energy security, thereby contradicting and implicitly criticising the self-congratulatory sentiments expressed in the communique of the Tokyo Economic Summit; and they agreed that demand for OPEC oil would rise from 17 million barrels a day this year to 22 million barrels a day in only three years time. The Ministers were able to agree to give emphasis to longer-term, perhaps much longer-term, measures such as energy conservation, building up a strategic reserve of oil, finding new sources of energy and

resisting barriers to trade in oil. But they did not address the problem of how to ensure that those 22 million barrels of oil a day would reach the Western World's consumer countries on acceptable terms in stable market conditions.

11.The countries with the largest volumetric interest in the stability of the price of oil at a level supportive of their economy are the United States, whose 250 million citizens consumed in 1986 35% of all the oil produced that year in the Western World; Saudi Arabia, together with the other major owners of oil reserves in Arabia, Iraq and Iran,and Mexico: these countries command 65% of World proved reserves of oil; and the Soviet Union, the third largest exporter of oil after the Middle East and Latin America.

12. The dependence of the USA on imports is increasing because of declining production from the USA´s domestic reserves, which are also declining, and rising consumption. A Report to the President on the Energy Security of the United States published in March this year accepted that the USA could be importing 50 per cent of its requirements by 1990. The USA´s imports of oil could rise from six million barrels a day in 1986 to eight million in 1990 and 11 million barrels per day in 1995. Requirements on this scale can be met only by the OPEC countries from their substantial surplus oil production capacity : 50% in Saudi Arabia, 20% in other countries around the Gulf and 30% in other OPEC countries; whilst non-OPEC countries have only 5% spare capacity and that will disappear as British North Sea and Alaskan production decline, increasing the demand for the supply of oil from the OPEC countries and particularly from Iran, Iraq and the member countries of the Gulf Cooperation Council (GCC).

13.The United States certainly has a national interest in ensuring a flow of oil imports on acceptable conditions and in adequate quantities; in volumetric terms its import requirement will soon match that of the nineteen countries of Western Europe, be double that of Japan and exceed the import requirement of the whole of the Rest of the World. In considering the political dimension of oil, one has to accept that the United States, conscious of its vulnerability, will wish to take a leading role in this oil context, as in virtually all other contexts, in the Western World. The value to the Western World of the Report to the

President of the United States on Energy Security is that it provides a script for that leading role which, because of its importance for the Western World, is relevant to my presentation today.

14.The Report's theme is that, and I quote, "Market forces should continue to provide basic direction; both producer and consumer governments should be encouraged to let supply and demand determine prices and production levels". The British Prime Minister, Mrs Thatcher, could not have put her own position better herself. And both governments appear to be persuaded, explicitly in the aforementioned Report in the case of the United States Government, that they should preach their market forces doctrine to the producer governments through bilateral diplomacy, that is, talking separately to each producer government since, and again I quote the Report to the President, "in order to limit the concerted market power of any group of producers, the United States must avoid multilateral producer-consumer dialogues or any other actions that might strengthen the solidarity of collaborating suppliers or otherwise improve their opportunities to control supplies or prices".

15.The Report placed obstacles in the way of objective policy-making by pre-empting any dispassionate consideration of the roles of Iran and Iraq: it cast Iran (together with "radical ideologies" and the Soviet Union) as a disruptive influence; and while the Report was antipathetic towards Iran it avoided any mention of Iraq as a major participant in the politics of the region, in time of peace as well as in time of war. Thus we saw in this Report the groundwork being laid for the action which the United States Government is now taking in the Persian Gulf. The mercantile and military naval dispositions which the United States Government has made - the reflagging under the US Flag of 11 Kuwaiti tankers and their escort through the Gulf by units of a fleet of some sixty warships - permit one member of OPEC, Kuwait, to meet, or even exceed, its quota whilst permitting another, Iraq, not only to exceed its quota but also to do what it will to disrupt the response to market forces of another member, Iran, and warning another, Iran again, that Kuwait's oil exports are sacrosanct.

16. The confused brinkmanship of Western action in the Gulf stems, I believe, from a failure to recognize that the stability of oil supply is a function of foreign policy. If you have any doubts about the foreign policy context, please remember that the United States consumes one-third at least of all the oil produced in the Non-Communist World, Western Europe 25 percent and the 24 countries grouped in the OECD (Organisation for Economic Cooperation and Development) 80 percent. Such an enormous demand - 33 times that of the billion people of South Asia, for example - for access to vital industrial and strategic resources 90 per cent of which are found outside the frontiers of the OECD must surely be a major consideration in the formulation and implementation of foreign policy.

17. And what of the Soviet Union? The Soviet Government will have been aware for as long as the Americans have been of the strategic importance attached by the United States Government to access to Middle East oil supplies. As long ago as 1943 Secretary of State Cordell Hull advised President Roosevelt that United States interests required that "no great Power be established on the Persian Gulf opposite the important American petroleum development in Saudi Arabia." The Soviet Government will know that any interruption in supply from the oilfields around the Gulf would be critical for the United States and that any attempt by the Soviet Union to bring about such an interruption or to stop the supply absolutely would be a casus belli. The United States position having been made thus clear, it seems to be unlikely that the Soviet Union would challenge it at the risk of a Third World War. I suggest to you that both the Superpowers have an interest in restoring and preserving the stability of the Persian Gulf region.

18. I doubt that anyone would disagree that the Gorbachev era is seeing far-reaching changes in Soviet domestic and foreign trade policy of which its oil and gas exports are at the heart. Sixty percent of hard currency earnings are derived from the sale of oil with exports of natural gas providing a further 20 percent. Over 3 million barrels of oil a day are exported together with 35 billion

cubic metres of gas going to Western Europe. In an article in The World Today in July, Professor Odell has suggested that the foreign-exchange earning power of natural gas exports is the essential seed-corn on which future Soviet economic development under Mr Gorbachev depends. Earlier this year, in March, a report on Soviet Oil and Gas Exports issued by the Joint Energy Programme based on Chatham House in London has suggested that Soviet oil exports to the West might be halved by the mid-1990s because of falling oil production and increasing domestic demand. On the other hand, a study by Mrs Machiko Nissanke, a Research Fellow at the Oxford Institute for Energy Studies, suggests that the Soviet Union is determined to remain a net oil exporter, not letting its production fall below 600 million tonnes a year and sustaining oil exports through a continued growth in gas production, a recovery in coal production and domestic energy saving measures even if oil production were to fall below the planned target levels.Clearly, there are contradictions here and problems to be solved by Mr Gorbachev if his programme is to succeed; but the interaction among Soviet economic, energy and international trade policies will have foreign policy implications which the Western World will have to take into account in framing, as I hope they will, their own foreign policy appreciation of energy supply security.

19. Foreign Policy also includes international economic and financial policy. Recent reports from the OECD and the Bank of International Settlements warn of a significant worsening in the economic performance of the industrialised nations. The risks they forecast (a disorderly collapse of the United States dollar, a retreat into protectionism and a world recession) make it essential that the lip-service paid to policy coordination in the communiques from the Western Economic Summits should become a reality. That reality should recognise that there is no energy source in sight that will replace oil as a source of portable energy and that while the World continues to have an oil-based economy the price of oil will be an important factor in the calculations needed by governments for the formulation of their public policy and for the necessary coordination of that public policy among governments if the World is to avoid recession.

20.Mr.Peter Holmes, the Chairman of Shell Transport and Trading and a Group Managing Director of Royal Dutch/Shell, in a speech on 8 May 1987 at Chatham House in London to the British Institute of Energy Economics, posed for the World, in the context of oil prices, the choice between evolutionary stress and destabilising trauma. Mr. Holmes suggested that with non-OPEC supply falling and demand rising and prices consequently tending upwards, expecially if the OPEC producers constrain supply, support from non-OPEC governments and institutions would be necessary for successful price management and to allow prices to evolve in a gradual way.

21. The same choice, between evolutionary stress and destabilising trauma, would appear to face the World in the wider context of the world economic situation, in which the Groups of Five and of Seven (I refer to the Plaza Hotel Agreement of 1985, the Louvre Accord of February this year, and their meeting in Washington on Saturday) have already shown at their meetings that they do not hold with the power of market forces to produce the results they want for, for example,the value of the United States dollar, which is so important for the oil producing countries whose commodity is priced in, and sold, for dollars. These petrodollars will buy 11 percent less this year than they did a year ago: the Iranian Oil Minister has said that the price of oil per barrel would have to be increased to $22 at the end of this year to maintain the purchasing power of $18 at the beginning of 1987. The United Kingdom has also little to cheer about in this context: its exported barrels are now worth 60 percent less than they were when the dollar peaked. If the Groups of Five and Seven are willing to countenance official and central bank intervention to stabilise the dollar, why should they, and we, then believe that market forces alone will regulate the supply and price of oil, which so comprehensively dominates World trade and to which the OPEC countries contribute about 50 percent of the barrels in trade? These countries also control 68 percent of the World's proven reserves of oil whilst the Western industrialised world as represented in the OECD will by the end of this century be importing, according to recent IEA estimates, an additional six million barrels of oil a day, raising their import dependence for this essential commodity to 63 percent of their requirements.

22. Am I taking symbolism too far if I compare the naval situation in the Gulf to the Western Governments attachment to market forces? The open-ended committment in the Gulf accepted by the United States Government and entrusted to the US Navy in narrow and shallow waters gives the sailors little room for manoeuvre or for the practice of their strategic and tactical skills developed for open ocean warfare. The Western committment to market forces, which can operate effectively only in an open ocean of free world trade where the balance between supply and demand is reasonable for buyer and for seller, reflects a strategic

approach which totally ignores the tactical requirements of a market where the economic balance between the principal producers and consumers has always been, and will continue to be, unrepresentative of their industrial, commercial and social requirements; the narrow waters are reflected in the declining ability of the Western non-OPEC world to supply oil; and the lack of Western room for manoeuvre will be emphasized by the increasing requirement for supplies of OPEC oil.

23. So what is the outlook for the next twelve months? We can look forward to a pick-up in spending by oil and gas producers around the World if OPEC maintains its strict quota discipline and its committment to oil price stability and if (a big "if") the price remains steady around its $18 a barrel "reference" price. But any recovery in petroleum industry activity will take place in an uncertain geopolitical situation. The principal differences from a year ago are that the continued flow of oil out of the Persian Gulf is now a function of the military relationship between the United States, as Kuwait's protecting maritime power, and Iran and Iraq; and that United States military intervention in the Gulf has called into question the continued validity of the Western belief that the working of Market forces alone would ensure the supply of oil on reasonable terms to world markets. There is now an urgent need for the oil-consuming and producing World, remembering, too, the possible impact of Mr. Gorbachev's policies, to collaborate on studies of the geopolitical process of the international petroleum market in order to identify problems and to find solutions, being always aware of H. L. Mencken's warning that "There's always an easy solution to a problem - neat; plausible; and wrong."

Thank you.

PETROLEUM INDUSTRY IN CHINA--
CURRENT SITUATION AND MEDIUM-TERM OUTLOOK

Presented by
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International Oil and Gas Markets Conference
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Calgary Convention Centre
Calgary, Alberta

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Mr. Lan majored in chemistry at the University of Shanghai in 1941. He then joined the anti-Japanese army led by the Chinese Communist Party soon after the Pearl Harbor Incident.

Mr. Lan was manager of several enterprises in the Northeast Liberated District during China's Civil War (1946-49).

Since the founding of the People's Republic of China, he was the first Director and founder of the Design Institute of Petroleum Industry in Beijing in the early 1950s. He was also a member of the Shanghai Economic Zone Planning Office and a special research fellow of the Techno-Economic Research Centre, both under the State Council PRC. He resigned from government office as an emeritus in 1984.

Mr. Lan wrote articles in Chinese Periodicals concerning energy economics, project evaluation problems and development strategy issues.

Mr. Lan was a member of the International Association of Energy Economists.

Mr. Lan died in London, England on September 18, 1987.

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China is one of the most ancient civilized counties in the world· Early to the first decade Anno Domini. the discovery of outcroped petroleum in the north-west part of her territory had been recorded in the well known literature *The History of Han Dynasty* (206 BC - 220 AD)· As to the begining of oil well drilling could be traced back to the 12th-13th century. The first oil well mechine-drilled in China was completed in 1817. with a depth of 131 meters and 11 berrels per day oil output· Nevertheless. China had no major oil production until 1960s· Early this century. some foreign geologists had even predicted that a large part of China had rocks of type and age in which no possibility of commercial oil deposits·

In the year 1949. when the People's Republic of China was founded. her total oil output was around 2400 bpd. of which 1400 bpd was of shale oil from low temperature retorting· China was still an oil importing country then. most of her crude oil and oil products were imported from the USSR. up to a maximum of 60.000 bpd in 1959·

(Slide 1) Due to the discovery of the Daqing oil field in 1961. China began its new era of oil self-sufficiency· Three and a half decades had passed since the founding of the People's Republic. the oil industry in China developed substantially· Last year. she produced 2·6 mbd of crude oil, ranked the 6th place in the world· Her natural gas output was 13·8 bcm· According to China's Seventh Five-year Plan, the oil out put in 1990 will be 3 mbd· and the yearly production of natural gas planned to be 15 bcm·

China's prospective oil resources is reported recently to be 575 billion barrels and her recoverable oil reserves has been estimated at 70 billion barrels· The area of sedimentary rock makes up 44 per cent of her territory, total volumn being roughly the same of that in the United States· Since it is far from being scrutinized, the long-term prospects of China's oil business are optimistic·

(Slide 2) But since late 1970s, production from existing oil fields had reached a plateau, as China's largest fields had already reached their peaks· The production of main oil fields are as follow (thousand bpd):

	1970	1975	1980	1985	1986
Northeast	447·4	1013·6	1171·8	1328·4	1358·4
Daqing	423·6	924·8	1030·0	1105·8	1111·0
Liaohe & others	23·8	88·4	141·8	222·6	247·4
North	20·4	93·6	382·2	289·8	294·0
Renqiu	-	-	320·6	206·2	200·0
Dagang	20·4	93·6	58·2	73·0	78·2
Others	-	-	3·4	10·6	15·8
East	93·4	334·4	358·4	550·8	601·2
Shengli	93·4	334·4	351·8	540·6	590·0
Others	-	-	3·4	10·2	11·2
Central South	5·4	17·4	83·2	158·6	176·0
Northwest	45·8	80·4	121·2	147·4	149·4
Southwest	0·6	1·8	2·0	22·8	23·0
Others	-	-	-	-	11·4
Total	613·0	1541·2	2218·8	2497·8	2613·4

(Slide 3) The rapid growth of China's oil exploitation, especially in the period of the ten year turmoil (1966-1976), had actually outpaced with the growth rate of national income, and finally led to an output stagnation in early 1980s· See following table·

	Annual growth rate of comparable national income	Energy consumption		Oil consumption		Oil production	
		A·G· rate	Elas· Coef·	A·G· rate	Elas· Coef·	A·G· rate	Elas· Coef·
1965-75	6·89	9·16%	1·33	17·30%	2·51	21·15%	3·07
1980-85	9·72	4·86%	0·50	0·77%	0·08	3·35%	0·34

Note: A·G· rate -- annual growth rate

Elas· Coef· -- elasticity coefficient

(Slide 4) The above-mentioned status can be also shown in a graph with China's six Five-Year Plans lying on its abscissa· Comparing 1985's data with that of the first year of the First Five-Year Plan (1953), the national income increased by 6·2 times, the energy consumption 13 times, the oil consumption 62 times and the oil production 200 times·

The natural gas production in China did not match that of pretroleum these years· In terms of oil equivalent, the natural gas reserve is merely of 3 per cent that of oil, and 10 per cent for production (1985)· The non-associated natural gas which accounted for one half of the total gas output all along, was produced mostly in Sichuan Province south-west of China·

Off-shore exploration and exploitation are being undertaken by the China National Offshore Oil Corporation in co-operation with foreign oil companies· Since 1979, the CNOOC signed 36 contracts with 45 foreign firms from 12 countries for geophysical survey in 8 zones totalling 430 thousand square kilometers in South Sea and south of the Yellow Sea· By last June, foreign oil companies had invested more than 2 billion US dollars and drilled 162 exploring wells, of which 65 tested positive for oil and gas, the success rate of 29 per cent is slightly higher than the world average. A number of prospective formations were found, but no giant ones up to now. Owing to the oil prices slump, Western oil companies have cut their drilling operations in China, slowed their pace and appear to be more prudent in signing a contract. Now the CNOOC is breaking away from a rigid contract formula and taking more flexible messures, so a bilateral contract with British Petroleum Development LTD for drilling a wild cat well in the South Sea was signed last August. It markes the first bilateral contract China has signed with a foreign partner since the second round bidding for South Sea oil was closed in March.

As to the downstream sectors, China has a refining capacity of about 2 mbd made up of some 50 industrial-scale refinaries. Chinese crudes are somewhat heavy and waxy but less sulphur, its API ranged from 27 to 33 degrees. So that more upgrading processing units are needed. Capacity of catalytic cracking makes up 24 per cent that of primary distillation, thermal cracking and delayed coking takes 10 per cent and that of hydrocracking one per cent. Basic refining installations and most auxiliary equipments are domestically designed and manufactured, but China imports new technology and equipments from abroad as well, especially the petrochemical installations.

China began to export oil on a small scale in 1962, 1260 bpd of crude and 550 bpd of products were exported then, but exports rose sharply since 1973. In the period of 1973-85, China increased her crude oil exports at an annual rate of 26 per cent up to 600 thousand daily barrels. In view of the shortage in domestic markets and the world oil prices plummet, China reduced its oil exports to 570 thousand bpd by 1986.

Japan is the main importer of Chinese crude, next to it are Singapore, Brazil and the US. Over 80 per cent of China's gasoline exports go to the US markets, mostly as blending components to be further upgraded to meet US specification. As to the diesel oil exports, primarily they go to Hongkong, Southeast Asia and South Asia. But on the other hand, owing to the shortage in local domestic markets, some coastal provinces imported one million tons odd of diesel oil last year.

China has a huge population of one billion, so there bound to be a big potential domestic oil market, though it is now undeveloped. The oil consumption per capita in China made only 92 kgoe, about one sixth of the world average. Corespondingly, the communication system in China was quite obsolete, the sedan occupancy per thousand people rated only 0.27. Nevertheless, China's domestic oil supply is seriously falling short of demand right now. While China is tending to boost her auto industry and to make her own jumbo jets, the oil shortage will be further deepened in the future. This shortage had been somewhat concealed in the past, due to oil products were allocated by governmental planning or by ration, but it has been unveiled eventually by the price gap of a two-tiered oil pricing system emerged in China. For example, gasoline is sold on official price for 45 cents per gallon (ex refinery, whole sale), that on "high price"(extra-quota price) 63 cents per gallon, and the "negotiated price", some what reflects the willingness to pay, strikes 92 cents. This fact, the "negotiated" gasoline price is higher than that of world markets, will logically raise a question; Was China profitable in its oil exports?

Some popular idea argues that oil and its products had been main hard currency earner for China, as oil exports revenue accounted for 21 per cent odd income of total exports in China's Sixth Five-Year Plan period (1981-85). It also worries that there seems no other major exporting goods can replace oil. But the opposite opinion has been strengthened by the fact that the deficit of oil revenue in 1986 since the oil price slump, some 3 billion US dollars, has been actually compensated by other exports. According to the law of comparative advantage, China is rich in labour forces but poor in per capita natural resources, such as petroleum. So, in accordance with her development strategy, exports of manufactured goods of high value added and imports of raw or primary products have to be the basic guideline for her international trade.

Considering those pros and cons, I personally believe the trend of Chinese petroleum exports will be retarded from now on. Eventually, the quantity of oil exports by the year 2000 is presumably to be negligible. It is also expected that in the begining of the next century. China would shift to a net oil importing country, if the econoimic reforms were to be practiced more smoothly, though its domestic oil supply remains to be the mainstay.

(Slide 5) When oil production peaked in 1979 and hovering around 2 mbd for a few years, the Chinese government tried out a "contract-responsibility system" in 1981 with the Ministry of Petroleum Industry. This incentive measure stipulated the increment surpassing production quota e·g· 100 million tons oil a year, can be exported by the Ministry itself to earn foreign exchange or sold in domestic market for 44 dollars per barrel, while the official price was some 8 dollars per barrel (USD: CNY = 1·7). Therefore, it had been commencing a two-tiered oil pricing system as for today. Examples are given below: *

		official prices	"high" prices	"negotiated" prices
Daqing crude * *	$ /b.	3·7	20	
Shengli crude * *	$ /b.	3·9	18·5	
gasoline (ON 70)	¢/gal· * * *	45	63	92
diesel oil * * *	¢/gal.	35	67	93

* USD: CNY = 3·7

* * Well-head prices

* * * Ex-refinery wholesale prices

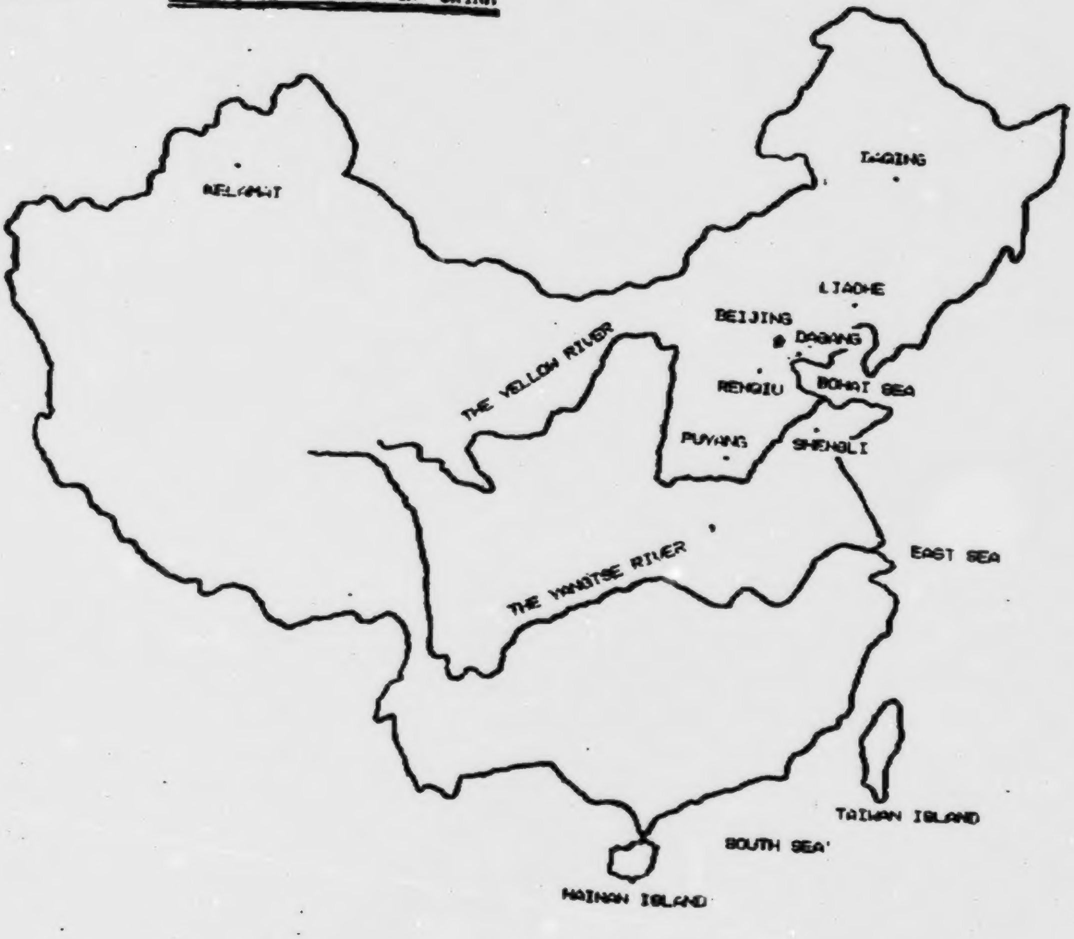
The two-tiered pricing system fuelled the oil industry more fund to explore new reserves to maintain and increase its output. This practice can be regarded as one of the typical cases in China's economic reforms, though it is but a interim phase.

The Communist Party of China had adopted a resolution of economic structural reforms since October 1984, stressing to overcome its ossified mode of administration, and shift to a planned commodity economy from mandated central planning economy. This is an epoch-making chang in ideas. though it would have to cover a long journey in its self-realization. Chinese premier Zhao Zi-Yang had pointed out that a new economic system will consist of a trinity as follows: First. to further invigorate the enterprises. especially state owned large and medium-sized ones. and make them socialist commodity manufacturers and dealers that are independent in management and responsible for their own profits and losses: second. to further expand the socialist commodity market and gradually improve the market system; and third. to relax gradually the state's direct control over the economic operation of enterprises in favour of indirect controls in the form of economical. legal and. if necessary administrative means.

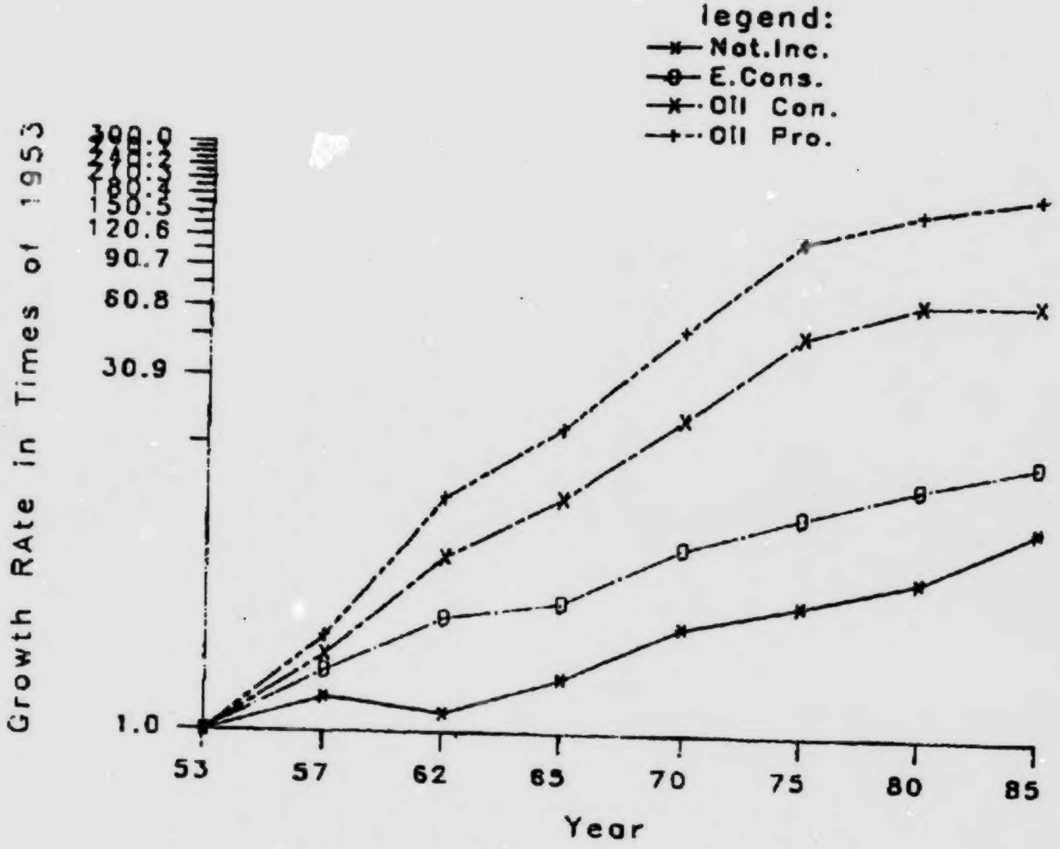
In line with economic reforms. China insists on a policy of opening to the outside world. which encourages the exchanges of commodities. services. funds. informations and personales. In order to improve its investment environment and to facilitate the absorption of foreign funds. the Chinese State Council had promulgated a twenty-two article provisions on October 11th last year. to grant special preferences to the enterprises with foreign investment. Consequently. in the sphere of oil exploration and exploitation both on shore and off shore. as well as the construction of refineries and petrochemical plants. China welcomes wide international co-operation.

There is an old adage in China which says: "Seven things have to be dealt with everymorning: Firewood. rice. edible oil. salt. sauce. vinegar and tea." This proverb bears out that Chinese had given high priority to energy in their economic life long ago. Therefore. it is resonable to infer that in the wake of economic reforms. China will certainly develop its oil business well to meet the demands on its modernization drive.

Slide 1 **MAJOR OIL FIELDS IN CHINA**


KELAMAY
DAQING
LIAOHE
BEIJING
DAGANG
RENQIU
BOHAI SEA
PUYANG
SHENGLI
THE YELLOW RIVER
THE YANGTSE RIVER
EAST SEA
TAIWAN ISLAND
SOUTH SEA
HAINAN ISLAND

Slide 4 Growth of Oil Prod.,Oil Cons.,Nat.Income,E.Cons.



ENERGY INVESTMENTS AND THE PACIFIC RIM LDCs

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1. INTRODUCTION

The precipitous decline of crude oil prices on international markets in recent months has highlighted the symbiotic relationship between petroleum and the world economy. The oil price collapse has had an impact in three major areas: on the world economy, on the petroleum industry itself, and on the energy policies in the developing countries. Growth in the industrial countries slowed to 2.5% in 1986 from 4.6% in 1984, and to 4.2% in 1986 from 4.8% in 1985 in the developing countries. In analyzing these impacts, it is instructive to view them in the perspective of the energy developments in the past and those projected for the future. The energy investments in the future will depend not only on the world economic activity but also on the prospects for the demand for and supply of different types of primary energy. Another key element in the level of future financial requirements of the petroleum industry will be the policies pursued by the developing countries and the international industry. The emerging energy scenario presents a major dilemma to the policy makers in the developing countries. They need to simultaneously anticipate the future growth in energy demand and to stimulate exploration for access to energy supplies, requiring major external financial investments. International institutions like the World Bank will need to help the developing countries to evolve policies, to develop financial strategies and to create a framework for sustained growth in these periods of uncertainty.

2. THE ECONOMIC FRAMEWORK -- IMPACT OF THE OIL PRICE DECLINE

Over the last 15 years, events in the petroleum market have completely dominated the global energy economy. Since 1970, the oil market has experienced two supply disruptions which led to large increases in oil prices. Both price shocks led to a sharp decline in oil consumption and set in motion a rapidly declining trend in energy intensity. Substitution of non-oil energy resources for oil led to a dramatic shift in relative energy demand away from oil. Oil consumption declined to 3% per year during 1973-79, and from 1979-85 to 2.2% per year. Energy consumption slowed dramatically to 1.9% per year down from 5.6% per year in 1960-73 period. Not only was there a decline in energy consumption growth rate during this 25-year period, there was also a shift in the share of the major economic regions in total commercial energy consumption. The share of the industrial countries dropped steeply from 65% to 51%, while the developing countries increased their share from 13% to 24%.The precipitous decline of crude oil prices on international markets in recent months can be seen as a natural extension of the events of the past decade -- high oil prices leading to sharply lowered consumption levels in the short term, leading in turn to a glut of oil and a consequential sharp price drop. The income transferred by the collapse of oil prices in 1986 has been estimated at about US$115 billion, of which the oil importing developing countries gained about US$24 billion. OECD countries have been major beneficiaries of this direct transfer of resources. Turkey, Thailand, Korea, Brazil, and India were the principal beneficiaries among the developing countries. In contrast, serious export revenue losses were felt by the North Sea countries, the Soviet Union, and a number of other developing countries of which, in East Asia, Indonesia, China are notable.

The impact of the oil price decline on the developing countries of East Asia has been significant. There are three significant oil exporting countries -- Indonesia, Malaysia and China -- and three important oil importing countries -- Korea, the Philippines and Thailand. Among the oil exporters, the direct balance of payments impact of the oil price decline has been the largest for Indonesia, amounting to some US$4 billion annually, followed by China with about US$3 billion and Malaysia with US$1.6 billion. In relation to GNP, however, the impact is largest in Malaysia where it amounts to 5% of GNP compared with Indonesia where it is about 4.5% and China where it amounts to less than 0.5%. The fiscal impact is significant in Indonesia and Malaysia amounting to a Government revenue loss of 20% in both countries. Korea is, of course, the largest beneficiary. The drop in oil prices is expected to reduce the import bill by about $2.8 billion and in the Philippines and Thailand to just under 2% of GDP. All countries, however, have benefitted from the reduced interest cost of debt servicing, saving a total of $2.0 billion. The sharp decline in the dollar has tended to reinforce the adverse impact on the balance of payments for all the oil exporters. The sharp depreciation of the dollar, vis-a-vis the yen, is particularly important because Japan is a major source of imports and a significant proportion of external debt is denominated in yen. Although the impact has been the most severe for oil exporters, all of the East Asian countries have tended to be adversely hit by the depreciation of the dollar as a result of asymmetry between exports, for which the U.S. is a dominant market for the countries of the region, and imports of which a large proportion is from non-U.S. sources. Overall, growth slowed in the developing countries in 1986 -- their output grew at 4.2% as compared to an average of 6% a year in the two decades prior to 1980 and 4.8% in 1985. Output per capita rose by only 2.2%. In addition, the net lending flows to developing countries in 1986 remained at about one-third of their level of US$76 billion in 1981.

The availability and price of energy is undoubtedly one of the many factors which influences economic growth in the aggregate and in individual economies. There are many other factors which play an even more important role -- the population growth trends and age profile of particular countries, the state of industrial development, social and political organization of society, the international organization of markets for capital and the extent to which capital can move between markets, the availability and cost of capital, etc. A recent report of the World Bank examined the prospects for the world economy and the implications for growth in the developing countries. The growth in the developing countries could reach 6% per year if adjustment efforts of their own are combined with a favorable world environment. But if governments in the industrial and developing countries do not take up the challenge of adjustment, the result is likely to be slower growth with the developing countries growing at around 4%, a rate too slow for them to tackle their debt problems.

Not only is the rate of world economic growth in the future important, it is also evident that the rate of growth in the developing countries will be significantly higher than that of the industrial countries. This in turn has significant impact on the financial requirements of the energy sector, in general, and petroleum, in particular. The reason for this is that a shift in the share of energy demand from industrial countries to countries in the process of industrialization will entail a higher level of investments. Moreover, because part of the process of industrialization involves urbanization and the transport sector, a significant part of the energy growth can only be satisfied by oil products.

Clearly, these development have major implications for energy policy in developing countries. Governments in both importing and exporting countries face important and urgent decisions on how to respond to cheaper petroleum. The need to act is most inescapable in the exporting countries where the revenue loss, coupled with a resulting loss of borrowing power can be accommodated only by massive reductions in expenditure. In the oil importing countries, if the next decade of relatively lower oil prices provides a major boost to world economic growth, the supply of energy resources will in time need to be expanded requiring major capital investments. It is expected that the energy sector will continue to absorb a large share of the investment programs of the developing countries (between 15% and 35% commonly), the future energy outlook for these developing countries is fraught with major problems.

3. THE FUTURE ENERGY OUTLOOK

In one assessment, world energy consumption is expected to grow in the next two decades at an average rate of around 2.4% per year. Oil consumption is, however, projected to decline and its share in global energy consumption to fall from 41% in 1984 to 35% in 2000. During this period, total oil consumption per annum is expected to increase from 2,880 mtoe to 3,629 mtoe -- an increase of 26%; natural gas from 1,377 mtoe to 2,232 mtoe -- an increase of 62%; and coal from 1,988 mtoe to 2,837 mtoe -- an increase of 43%.

Almost half the increased energy consumption is expected to be in the developing countries. During the 1970s, their demand for commercial energy grew at nearly 6% per year. Energy consumption is likely to continue to grow faster in the developing countries, partly because their economies are growing faster, along with their populations, and partly because increasing industrialization and urbanization will entail a rapid increase in their commercial energy use. The demand for energy will also be influenced by inter-fuel competition, the success in lowering costs of exploration and production, the policy directions mandating a balance between imported and indigenous resource development and in fuel-mix for corporate users of energy as insurance against supply interruptions or price upheavals, and the likely continuation in the trend towards increased efficiency of energy use and more fuel efficient technologies. As a whole, energy demand is thus projected to grow at an average rate of around 4% per year in the developing countries. Despite major efforts at oil exploration, the oil-importing developing countries are expected to rely on imports to meet more than 65% of their petroleum consumption requirements in 2000.

Stimulated by high prices during the past decade, new reserves were identified for a variety of energy sources -- most notably oil and gas. But it needs to be noted that world's production of fuels increased at only 1.8% per year between 1973 and 1984 compared with 5.6% per year growth between 1961-73.

In summary, the key factors to note in the emerging energy scenario are:

- Despite the present drop in oil consumption, the long term prospects for energy demand show a steady and continuing growth. Even in the most conservative projections, oil and gas are expected to supply about 57% of the total energy demand in 2000. The total annual oil and gas production will increase from 4,257 mtoe in 1984 to about 5,861 mtoe in 2000, corresponding to an average annual growth of about 2.3%.
- The major increase in energy consumption is projected to be primarily in the developing countries. It is expected that they will rely on as much as 65% of imports to meet their petroleum consumption requirements in the year 2000. There will, therefore, be a continuing emphasis on oil exploration and production in the developing regions of the world.
- There is likely to be a greater emphasis on coal and natural gas.
- The price of oil will continue to be the spearcarrier of energy prices in the near future.

4. THE DILEMMA OF THE DEVELOPING COUNTRIES

Petroleum has played -- and will continue to play -- a major role in the energy economies of many developing countries. Policy makers in the developing countries confront painful choices, made difficult by the uncertainties that overhang the oil sector: will prices rebound? when will they rebound? how long will the trough in industry activity persist? how steep and how long will be the oil industry's next expansion period?

The price crash of 1986 has meant that cash flows for all petroleum enterprises have been substantially curtailed. This curtailment of cash flows means that less money is available to procure vital supplies and equipment to maintain current production programs. It also means that less capital is available to carry out new exploration undertakings and for new investment in production, refining and transportation facilities. And national oil companies are significantly less able to generate revenues for their governments.

All oil exporting producer countries confront a particularly difficult task: they are dependent upon oil revenues to service and amortize the debt they incurred in their rapid expansion of infrastructure. A rational petroleum policy would require new transfers from the public sector into the petroleum industry at a time when no such sources of revenue are available since the international economic growth has not permitted a concomitant increase in exports of the developing countries. The depreciation of the dollar against other internationally traded currencies has provided a double loss in income.

The structure of competition in the international petroleum sector has also changed substantially. Today, current and prospective producers of crude oil are competing with one another for the increasingly scarce resources of the international oil companies. Host countries must offer increasingly attractive fiscal and contractual terms to companies, at the very time that they also need acutely to increase government revenues. But the shift in the structure of the crude and products markets from a sellers to a buyers market has also created new opportunities for the oil importing countries to generate substantial savings.

The very magnitude of the energy investments required in the developing countries poses formidable financing problems in the present environment. As a rough approximation, one may estimate that the share of energy investment in GDP in these countries has risen from about 1-2% to about 2-3% during the last decade. The projections for the next decade are projected to require energy investments of the same order and perhaps increasing to about 4% of GDP in the later years. Based on a detailed exercise done by the Bank in 1983, the share of energy investments over the period 1986-2000 may be roughly estimated at between US$80-120 billion per annum. The capital expenditures on oil exploration and production in the developing countries of the Far East have averaged about US$5.5 billion per annum in the early eighties, while the total in the non-CPE economies has dropped from a high of US$89 billion in 1982 to US$68 billion in 1984.

The bulk of external financing in the oil and gas development in the past has been in the form of export related credits and commercial flows. In the present environment, the projected required investments in the oil and gas sectors is unlikely to be available from the conventional sources alone. Thus, the developing countries face painful choices in selecting financial instruments to fund their energy strategies.

5. POLICY ISSUES IN THE PACIFIC RIM COUNTRIES

There are a number of major policy issues confronting the developing countries of East Asia. The East Asia and Pacific region comprises of a number of developing countries with quite different energy problems without a common theme. In the oil importing countries such as Thailand, Philippines and Korea, there will be a need to maintain policies which encourage efficient use of energy, as well as attract scarce private risk capital to continue exploration. Equally, there will be a need to carefully review investment options in a climate of uncertain oil prices as well as the scope for restructuring the large national oil companies in the sector, and support the mobilization of domestic resources at a time when government revenues are declining. For a second group of countries, which export oil -- Indonesia, Malaysia and China -- there will be a short-term need to maintain, to the extent possible, export revenue, while in the longer term reduce their potential vulnerability to a single energy choice. Investment strategies in these countries will, therefore, need to promote energy diversification, particularly into natural gas, LPG and, where feasible, domestic coal. The awareness of natural gas as an important source of energy is relatively recent in this group of countries and many of these countries (Korea, Indonesia, and Malaysia) are on the verge of developing major domestic gas industries using the power sector as the major engine of growth.

The policy issues which need to be resolved in individual countries of Asia clearly depend upon the particular resource position of the country. Tables 1 and 2 summarize the basic energy indicators for these countries.

China

The continued availability of low cost energy supplies is a critical element in China being able to meet its ambitious growth targets by the end of the century. China's energy policy makers will need to formulate strategies to encourage increased efficiency in the use of energy as well as rationalize investment strategies in the energy sector. If China is to maintain a high rate of economic growth in the future, it will need to continue to increase significantly the production of all types of energy. For the petroleum industry in particular, this presents a major challenge, since the largest onshore oil fields have either reached or will soon reach their peak production rates, while the prospective, but as yet underexplored, remote NW onshore areas of the Tsaidam and Tarim basins present logistical constraints. Over the past 5-6 years, considerable progress has been made toward establishing an appropriate policy framework and significant steps have been taken to achieve its production target. The Government has:

(a) encouraged offshore exploration and production by international oil companies;

(b) recently opened up onshore areas (in 10 southern provinces) to foreign exploration;

(c) undertaken a program of modernization of the petroleum bureaus; and

(d) started to place increased emphasis on the development of natural gas.

The Government's strategy in the energy sector has been pragmatic and, despite some operational problems, largely successful in promoting production increases. The recent sharp drop in oil prices introduces new uncertainties. Will China be able to maintain a level of exploration activity both onshore and offshore involving public and private capital in a climate inauspicious towards further petroleum exploration? Will the impending shortages in petroleum products particularly for automotive fuels be a major impediment to the modernization of China's economy? Can China in a relatively short period of time achieve major gains in the efficiency with which it uses energy? There will be a need to mobilize large amounts of private capital and management and at the margin there will be an important role for financial and development institutions.

Indonesia

Oil plays a crucial role in the Indonesian economy, accounting for about 86% of commercial energy needs and, together with LNG, for 68% of export earnings. It is estimated that net oil/LNG export earnings fell from about $6.0 billion in fiscal 1986 to about $2.4 billion in fiscal 1987. There is, thus, a clear need for Indonesia to diversify the pattern of its energy use away from oil -- the importance of which is being recognized by the country's policy makers. Indonesia is fortunate in having a wide range of indigenous options with which to meet its energy requirements. Its future oil production will depend on three factors: reserves added from oil in known fields, reserves added from new fields, and production restrictions related to OPEC quotas. The use of natural gas presents major potential for energy diversification away from oil. Gas provides, for example, a major new option for power generation, including substituting presently oil-fired generation in Java and basing a substantial part of future generation on gas obtained from offshore Java and Kalimantan. The provision of gas to the power sector can also facilitate the supply of gas to the manufacturing industries, as well as expand its market in urban areas for small/medium industries and households. But natural gas needs to be made available at a competitive cost and in sufficient quantities. This requires the Government to expedite the exploration and identification of the remaining undiscovered gas reserves in Java through setting in in-place of an acceptable framework of prices -- such that it is financially attractive for the oil companies to produce the gas and for the power sector to use it. The substitution of kerosene -- which accounts for over one-third of the country's final consumption of petroleum products -- by LPG is another area of energy diversification with significant potential. The Government would, however, need to promote the use of LPG as a substitute for kerosene use for household cooking and lighting through appropriate institutional and financial changes.

Malaysia

Oil and gas supply over 90% of Malaysia's domestic and commercial consumption. In response to the financial problems caused by the sharp drop in oil prices, the Government has, on the one hand, scaled back development expenditures during the fifth five-year plan (1986-90) by 40% and, on the other, moved towards promoting private investment by liberalizing investment regulations, improving financial and credit conditions, and encouraging direct foreign investment. Its fuel diversification strategy is already well underway, particularly with regard to developing its natural gas potential. It is forecast that oil's contribution in commercial energy consumption will fall to about 60% in 1990 and to 49% in 1995. The share of natural gas is expected to increase substantially to 27% in 1990 and to 38% in 1995. But these projections are based on the assumption that appropriate promotional and pricing policies will be put in place to encourage gas utilization in all sectors of the economy.

The natural gas reserves, estimated to be about four times as large as the oil reserves, can be utilized in the power sector and, given appropriate policy decisions, the fuel mix for the power sector on the Malayan peninsula can be as high as 81% gas and 1% oil by 2000. What is required is an appropriate policy framework that is fully supported by institutions capable of implementing efficiently a sequence of priority investments in energy diversification.

Korea

Korea is the largest beneficiary of the oil price fall among the region's oil importers. Korea is expected to record a substantial surplus in its current account (US$1 billion) in 1986 for the first time in its history. The main issues in the energy sector during the next decade will be (i) whether Korea will be able to reduce its energy intensity factor by some 20% at a time when oil prices are low; (ii) inter-fuel substitution (oil, LNG, nuclear power, coal, etc.); and (iii) energy pricing policies. A major issue facing Korean policy makers for the past decade has been that of energy supply diversification for supply security as well as economic reasons. This has led to plans to import LNG from Indonesia, build nuclear power plants and to import large volumes of coal. The fundamental supply policy will need to be readjusted to the most cost efficient and flexible supply systems while taking into account environmental concerns. Another successful strategy already adopted by the Government has been to secure more reliable oil supplies by overseas petroleum exploration.

Thailand

The recent fall in the oil prices does not undermine the basic tenet of Thailand's long-run energy strategy of developing indigenous petroleum resources which are primarily natural gas. The Government is assessing the possibility of maximizing short-term gains that could accrue from substituting fuel oil for natural gas while minimizing the potential long-term costs in terms of disincentives for petroleum exploration and development activities. Thailand's negotiations with gas producers have been protracted mainly because of gas pricing issues. The Government is aware of the need to maintain Thailand's competitiveness compared with other countries in attracting IOCs to undertake risk investment, but perhaps there is need to reassess incentives provided to the oil industry. There is also a need for the Government to adopt policies which would allow for more rapid conclusion of the contracting process, including the establishment of clear guidelines on the pricing of gas to producers and consumers. The Government is currently reassessing the scope of the public sector role along with an investigation of the feasibility of increasing private sector involvement in different facets of the energy sector.

Philippines

The balance of payments impact of the oil price decline in the Philippines is similar to that of Thailand, equivalent to 1.5 to 2% of GDP. In the medium to longer term, several key questions remain concerning the Government's future energy sector strategy and a number of policy issues will need to be addressed. First, the cost to the Philippines economy of striving toward energy self-sufficiency, particularly in the case of developing geothermal and/or domestic coal resources as alternatives to imported oil and coal at today's and near term prices. In this regard, the fuel balance in future power generation is a critical element in any energy investment strategy. Other areas include adjusting energy prices including power tariffs, rationalizing the fiscal regime which governs the production of the country's domestic energy resources, a major effort in resource mobilization for the energy sector, particularly the scope for reverting a number of activities to the private sector, and a need to launch, in the near future, a major country-wide promotion of its petroleum prospects.

The policy framework in these countries has considerable interaction with the international industry, and international institutions like the World Bank can, and do, play a crucial, catalytic role in the development of their energy sectors.

6. INTERNATIONAL INSTITUTIONS AND THE ROLE OF THE WORLD BANK

The World Bank group, which is owned by more than one hundred and forty member governments, provides both financial and technical assistance to developing countries to stimulate economic growth. The World Bank has given, in the recent past, high priority to the energy sector in recognition of the critical limitations imposed in the past decade by higher energy prices. The World Bank's principal objectives for its energy program have been to assist developing countries to define and implement appropriate development strategies for the energy sector. This process can include (i) increasing the efficiency of energy use; (ii) undertaking a program of investments to develop indigenous energy sources which are cheaper than imported energy; and (iii) reorienting industries, agriculture and transport sectors to take account of the higher cost of energy inputs, and (iv) strengthening institutions and management capabilities to design and carry out sound energy policies effectively.

Until 1987, the Bank group has provided about US$184 billion in loans to the developing countries, of which 20% have been for the energy sector. In response to the developing countries' changing priorities during the 1970s, the Bank significantly increased and diversified its energy activities. Its energy lending increased and it began to support the development of petroleum, coal, and other primary energy resources which it had not previously financed. The Bank's direct contribution to mobilizing resources for the energy sector has, thus, grown substantially in recent years, more than doubling from US$1.5 billion in fiscal 1979 to US$3.7 billion in fiscal 1987. Although this is still a small fraction of the total investment requirements for energy development in the developing countries, it has made the Bank the single most important official source of external capital for energy development in the developing countries. In the poorer developing countries, which have limited access to commercial finance, the US$2.3 billion of higher concessional IDA financing provided during 1979-82 has made a major contribution to underwriting the process of structural change in the energy sector.

The Bank has also made a major effort to mobilize resources from other sources through cofinancing and through the identification for direct private investment. During the period fiscal 1979-82, the US$9.9 billion of Bank lending for energy was associated with another US$11.2 billion of cofinancing from bilateral and other multilateral agencies, export and suppliers' credits, as well as commercial banks and private sources. The highest degree of cofinancing has been in oil and gas development projects where every US$1 of Bank financing was matched by US$1.78 from other external cofinancers. The Bank also promotes direct equity investments by the international energy industry in developing countries' energy supplies.

The international energy industry plays a crucial role in resource development but, in a number of circumstances, the priorities of the private sector may not match the priorities of an individual country. Limited interest in developing small oil fields or gas resources, which have little export potential; the effect of the current cash constraints on the size of the international oil company investments in exploration in the developing countries; the unwillingness of the industry to invest in countries perceived as high political or economic risk; or a simple divergence in the priorities attached to a particular energy development project by an industry with global investment options and by the country, for which this may be the only prospect for improving energy supply. These factors may necessitate the allocation of public resources to energy development in a number of countries and, as a development institution, the Bank supports these national efforts when they are an appropriate feature of the country's optimal sectoral and national development strategy.

The average annual Bank loans in the Asian region over the period 1978-87 have been US$532 million for oil, gas and coal sector, which represented about 31% of the energy sector loans. In addition to Asia, the Bank has worked in Africa, Latin America, the Middle East and North America. The cumulative lending of the Bank and IDA for the energy sector has been of the order of US$37 billion. During 1987, energy sector lending represented about 21% of Bank's total lending of US$17.7 billion, with US$687 million being the share of the fossil fuels-oil, gas and coal.

7. CONCLUSION

The emerging energy scenarios and the fluctuations in oil prices portend a difficult period for the energy industry in the developing countries. A number of major policy issues will need to be resolved if the promise of adequate energy supplies is to be fulfilled. The World Bank plans to continue its efforts in Asian countries and with a special emphasis on gas. With the collaboration of the private oil industry and other financing institutions, the mobilization of institutional expertise in gas industry development, and, most important of all, the commitment amongst the energy and economic policy makers in the countries themselves, the Bank plans to maintain its presence in Asia, and, where it is appropriate, to help diversify future energy supplies, to alleviate their vulnerability to a single energy source and thereby enhance their growth prospects.

TABLE 1

ASIA-PACIFIC RIM COUNTRIES - BASIC INDICATORS

	Population (Millions) Mid-1985	GNP/Capita 1985 Dollars	Energy Consumption Per Capita (Kilograms of Oil) Equivalent)		Average Annual Energy Consumption Growth Rate (Percentage)	
			1965	1985	1965-80	1980-85
China	1,040	310	178	515	9.8	5.7
Indonesia	162	530	91	219	8.4	4.4
Malaysia	16	2,000	312	826	6.9	7.7
Korea	41	2,150	237	1,241	12.1	5.0
Thailand	52	800	80	343	10.5	6.6
Philippines	55	580	160	255	6.0	1.8
Industrial Market Economies	737	11,810	3,745	4,958	3.0	0.1

SOURCE: World Development Report, 1987.

TABLE 2

ENERGY INDICATORS OF PACIFIC RIM COUNTRIES

	Indonesia ('84)	Malaysia ('85)	Korea ('85)	China ('84)	Philippines ('85)	Thailand ('85)
I. Energy Supply						
Crude Oil/Products (M.Bbls)	516.9	165.6	0	802.3	2.7	13.14
Natural Gas (BCM)	43.1	11.4	0	11.5	0	3.75
Coal (M. Tonnes)	1.4	0	22.4	789.2	1.3	5.19
Electricity (GWh)	19,647.0	14,915.0	58,007.0	376,800.0	21,684.0	23,074.0
II. Structure of the Energy Sector (Percentage Share)						
A. Primary Energy Consumption						
Oil	68	69.7	51.0	17.7	65.4	64.7
Gas	25.4	20.4	0.0	2.3	0.0	20.2
Coal	0.5	2.6	39.7	75.1	10.7	9.7
Electricity	6.1	7.3	9.3	4.9	23.9	5.5
B. Sectoral Share						
Residential & Commercial	28.1	12.9	35.4	22.5	15.8	10.2
Oil	25.8	5.4	8.0	NA	6.4	2.7
Gas	0.8	0.5	0.0	NA	0.0	0.0
Coal	0.0	0.0	24.9	NA	0.0	0.0
Electricity	1.6	6.9	2.6	NA	9.3	7.6
Industry	35.1	44.5	35.4	61.0	44.4	25.3
Oil	19.2	32.0	14.6	NA	29.0	13.5
Gas	12.0	2.9	0.0	NA	0.0	1.5
Coal	0.7	4.2	14.5	NA	4.5	3.6
Electricity	3.2	5.5	6.3	NA	10.9	6.7
Transport	30.0	35.5	14.9	5.0	34.8	53.6
Others	6.9	0.0	6.6	11.5	1.6	10.8

SOURCE: Energy Indicators of Major Developing Member Countries of ADB (1986)

TABLE 3

CUMULATIVE LENDING OF IBRD/IDA UP UNTIL JULY 1987

	Africa	East Asia & Pacific	South Asia	EMENA	LAC	Total
Oil, Gas and Coal	470.5	1,333.0	3,123.2	1,089.5	1,061.2	7,077.4
Power	2,300.8	5,789.1	8,055.9	4,704.6	9,372.9	30,223.4
Energy	2,771.3	7,122.1	11,178.1	5,794.1	10,434.1	37,300.7
Energy/Total Lending	11.3%	19.2%	28.5%	15.7%	22.8%	20.3%
TOTAL LENDING	24,465.6	37,157.6	39,288.3	36,940.3	45,742.7	183,594.5

Oil, gas and coal as percentage of total energy lending = 19%

SOURCE: World Development Report, 1987.

TABLE 4

BANK'S ENERGY LENDING TRENDS -- 1985-87
(MILLION US$)

	1985	1986	1987
Oil, Gas and Coal	1,331.4	231.1	687.4
Power	2,250.3	2,786.9	3,016.9
Energy	3,581.7	3,018.0	3,704.3
Energy/Total Lending	25%	19%	21%
TOTAL LENDING	14,384.3	16,318.7	17,674.0

SOURCE: World Development Report, 1987.

TABLE 5

WORLD BANK'S ENERGY LENDING TO ASIAN COUNTRIES (1978-87)

	Annual Average 78-82	83	84	85	86	87
Oil, Gas & Coal						
East Asia & Pacific	100.2	339.7	159.4	236.0	97.0	--
S. Asia	144.8	478.3	498.0	591.0	--	548.0
Asia Region	245.0	818.0	657.4	827.0	97.0	548.0
Energy						
East Asia & Pacific	445.0	949.3	581.8	403.0	632.5	684.8
S. Asia	681.3	1,055.4	1,352.6	1,517.0	710.0	1,312.0
Asia Region	1,126.3	2,004.7	1,934.4	1,920.0	1,342.5	1,996.8
Oil, gas and Coal as percentage of energy	22	41	34	43	7	28

Average annual loans in oil, gas and coal in Asia over 1978-87 = $532 million.
Average annual loans in energy sector in Asia over 1978-87 = $1,720 million.

SOURCE: The World Bank Annual Report, 1987.

REMARKS BY R. W. MARTIN
PRESIDENT & C.E.O.
CONSUMERS GAS

CERI
[redacted]. CONFERENCE
SEPTEMBER 29, 1987

– SIXTH ANNUAL
INTERNATIONAL
OIL & GAS MARKETS.

IT IS INTERESTING TO OBSERVE THAT THE PROGRAM SEEMS TO ASSUME AT THE OUTSET THAT THERE ARE --- AT THE VERY LEAST --- FOUR DIFFERENT PERSPECTIVES, FOUR DIFFERENT VIEWPOINTS OF THE SAME SUBJECT.

IT IS PROBABLY REASONABLE TO ASSUME THAT THE PROGRAM DESIGNERS ANTICIPATED THAT THERE WOULD BE A FAIR AMOUNT OF DISAGREEMENT AMONG THE PANEL PARTICIPANTS --- AFTER ALL, NO ONE INTENTIONALLY PUTS TOGETHER A PANEL IN WHICH ALL THE MEMBERS ARE IN ACCORD.

I THINK WE MAY BE SURPRISED. I'M SURE THERE IS SOME DISAGREEMENT, BUT I SUSPECT THAT THE DISAGREEMENT VOICED TODAY IS CONSIDERABLY LESS THAN MIGHT HAVE BEEN EXPRESSED IN A SIMILAR PANEL A YEAR AGO.

TIME HAS OBVIOUSLY ALLOWED SOME OF THE ISSUES TO BE RESOLVED AND SOME OF THE PARTS OF THE NEW WORLD TO FALL INTO PLACE.

IT SEEMS THAT THE MORE WE TRAVEL ALONG THIS DEREGULATION ROAD --- (OR IS IT A TUNNEL?) --- THE MORE DAYLIGHT WE START TO SEE.

I WILL BE THE FIRST TO ACKNOWLEDGE THAT, AS A DISTRIBUTOR, MY PERSPECTIVE OF DEREGULATION HAS CHANGED SOMEWHAT DURING THE MONTHS IN WHICH WE HAVE BEEN GRAPPLING WITH THIS NEW PHENOMENON.

THAT SHOULD NOT BE TAKEN AS AN INDICATION THAT I AM COMPLETELY SATISFIED WITH EVERYTHING THAT HAS HAPPENED --- FAR FROM IT IN FACT --- BUT I DO SEE THE WHOLE SYSTEM GRADUALLY SHAKING DOWN AND BEGINNING TO TAKE ON SOME SEMBLANCE OF BEING A NORMAL PART OF OUR INDUSTRY'S WAY OF LIFE.

WE MAY ALL HAVE DIFFERENT PERSPECTIVES BUT ESSENTIALLY WE ARE ALL PURSUING THE SAME THINGS. PERHAPS IT IS OUR MOTIVES OR EXPECTATIONS THAT DIFFER.

WHAT THE DISTRIBUTOR SAW IN THE AGREEMENT AND IS TRYING TO ACCOMPLISH IS FAIRLY STRAIGHTFORWARD, --- GREATER CHOICE AND ACCESS TO THE WHOLESALE NATURAL GAS MARKET FOR ALL ITS CUSTOMERS.

THE CONSEQUENCE OF GREATER ACCESS AND CHOICE WOULD BE A MORE COMPETITIVE MARKET FOR NATURAL GAS AT THE PRODUCERS' END OF THE PIPELINE, THE BENEFITS OF WHICH, IF ANY, AND I EMPHASIZE, IF ANY, WOULD FLOW TO THE CUSTOMERS' END OF THE PIPELINE.

IT SOUNDS VERY SIMPLE, BUT YOU AND I KNOW IT WASN'T SO.

WORDS LIKE "DEREGULATION", "OPEN COMPETITION", "FREE MARKET", CONJURED UP VERY OPTIMISTIC IMAGES IN THE MINDS OF MANY PEOPLE.

WHETHER REALISTIC OR NOT, AT OUR END OF THE PIPELINE, IN THE MARKETPLACE, THE EXPECTATION THAT ALL THESE WORDS GAVE RISE TO WAS LOWER PRICES.

IF YOU WERE A CONSUMER, NO MATTER HOW MUCH OR HOW LITTLE YOU KNEW ABOUT THE WAY THE NATURAL GAS INDUSTRY FUNCTIONED, THE WORD "DEREGULATION" TRANSLATED DIRECTLY INTO ONE WORD --- "CHEAPER."

AS IT SO HAPPENS, THAT WAS RIGHT, --- AT LEAST FOR NOW. AT THIS POINT IN TIME, BECAUSE THE LAWS OF SUPPLY AND DEMAND ARE TAKING EFFECT, WE ARE INDEED SEEING LOWER PRICES.

THAT MAY NOT HAVE BEEN WHAT WESTERN OR PRODUCING INTERESTS HAD IN MIND WHEN THEY ADVOCATED THE REMOVAL OF PRICE CONTROLS, BUT CERTAINLY THE CUSTOMER EXPECTED THAT.

THEY WERE IN FACT ENCOURAGED TO EXPECT THAT BY WESTERN INTERESTS. THE PRODUCERS, THE BROKERS AND AGENTS WHO TRAVELLED EAST, ALL PAINTED VERY OPTIMISTIC PICTURES ABOUT THE CONSEQUENCES OF DEREGULATION.

THE MESSAGE, FOCUSED ON THE LARGE VOLUME MARKET, WAS SIMPLE. "REMOVE CONTROLS," THEY SAID, "AND COMPETITION WILL FORCE PRICES DOWN."

"FIND A WAY AROUND THE TRADITIONAL SYSTEM SUPPLY AND YOU CAN HAVE A LOWER PRICE."

NO AMOUNT OF CAUTIONS AND WARNINGS COULD SEEM TO CONVINCE ANYONE IN THE EAST --- AND LEAST OF ALL THE POLITICIANS --- THAT DEREGULATION DID NOT AUTOMATICALLY MEAN LOWER PRICES, PARTICULARLY WHEN THE MEDIA CONSTANTLY CARRIED MESSAGES OF LOWER PRICES IN THE U.S.

BUT THAT IS A BRIDGE OF ANOTHER KIND THAT WE WILL HAVE TO CROSS SOMETIME IN THE FUTURE.

WE SHOULD KEEP IN MIND THAT THE MAJORITY OF CUSTOMERS HAVE LITTLE OR NO IDEA OF THE STRUCTURE OF OUR NATURAL GAS INDUSTRY.

THEY DO NOT SEPARATE THE INDUSTRY INTO THE THREE SEPARATE ELEMENTS OF PRODUCTION, TRANSMISSION AND DISTRIBUTION, --- EACH WITH ITS OWN PARTICULAR PROBLEMS AND INTERESTS.

NOR DO THEY NECESSARILY UNDERSTAND GOVERNMENT'S ROLE IN THE INDUSTRY AND HOW GOVERNMENT CONTROL AND REGULATION IMPACT ON THE ULTIMATE PRICE TO THE CONSUMER.

THIS IS NOT MEANT TO BE CRITICAL. MANY OF US WOULD HAVE TO ADMIT WE DON'T FULLY UNDERSTAND ALL THESE FACTORS.

BUT WHAT THIS BOILS DOWN TO IS THIS. THE CUSTOMERS PRIMARY LINK TO THE INDUSTRY IS HIS LOCAL DISTRIBUTOR.

AND IF THE DISTRIBUTOR DOES NOT DELIVER WHAT THE CUSTOMER HAS BEEN LED TO BELIEVE HE IS ENTITLED TO, THEN THE CUSTOMER LOSES CONFIDENCE IN THE WHOLE SYSTEM.

THIS IS SOMETHING WHICH SHOULD NOT BE LIGHTLY DISMISSED.

IT TAKES YEARS FOR A CORPORATION OR AN INDUSTRY TO DEVELOP A POSITIVE IMAGE AND REPUTATION.

BUT REPUTATION AND THE PUBLIC'S TRUST CAN BE A FRAGILE THING --- MUCH MORE EASILY BROKEN THAN BUILT.

WHEN THE PUBLIC BELIEVES, RIGHTLY OR WRONGLY, THAT IT IS NOT GETTING A FAIR SHAKE, THEN THE TRUST AND CONFIDENCE IT HAS IN THE INDUSTRY IS IN SERIOUS JEOPARDY AND THAT IS BAD FOR THE WHOLE INDUSTRY. THE WORD "DEREGULATION" IS OF COURSE BY NO MEANS EXCLUSIVE TO THE GAS INDUSTRY NOR IN FACT NEW TO THE PUBLIC.

THEY HAVE ALREADY HEARD IT APPLIED TO OTHER INDUSTRIES --- AIRLINES --- TELEPHONES --- ROAD TRANSPORTATION AND MANY OTHERS, AND THE RESULT IN EVERY CASE WAS LOWER PRICES.

THEN IT IS SMALL WONDER THAT THE CONSUMING PUBLIC HAS SUCH A HIGH EXPECTATION OF RESULTS FROM THIS ELIXIR CALLED DEREGULATION.

SO HOW CLOSE HAVE WE COME TO THEIR EXPECTATION?

WE HAVE BEEN AT IT FOR ALMOST 12 MONTHS AND NOW WE CAN SEE AT LEAST THE DIRECTION IN WHICH WE ARE HEADING. THERE IS NO DOUBT THAT A GREAT DEAL OF PROGRESS HAD BEEN MADE.

THE LARGE VOLUME USERS AS EXPECTED WERE QUICK TO SEIZE THE OPPORTUNITY TO GO SHOPPING FOR LOWER PRICES.

MOST OF THE LARGER GAS USERS HAVE ALREADY NEGOTIATED, OR ARE IN THE PROCESS OF NEGOTIATING FOR LOWER PRICED SUPPLIES THROUGH A WIDE VARIETY OF MECHANISMS AND OPTIONS.

AND HASN'T IT BEEN AN EXCITING TIME!

LIFE USED TO BE FAIRLY SIMPLE --- PRODUCERS SOLD TO TCPL. TCPL SOLD TO DISTRIBUTORS --- DISTRIBUTORS TO CUSTOMERS UNDER APPROVED RATE SCHEDULES.

NOW THERE ARE BUY/SELL ARRANGEMENTS AT EITHER END OF THE PIPELINE, THERE IS "T" SERVICE, EITHER FIRM OR INTERRUPTIBLE, THERE ARE C.M.P.'S, M.R.P.'S, THERE ARE O.D.V.'S, AND I DON'T KNOW WHAT ALL ELSE.

IT SEEMS TO HAVE SPAWNED A WHOLE NEW LEXICON OF TERMS AND ACRONYMS, AS IF WE DIDN'T HAVE ENOUGH ALREADY.

IN ANY EVENT, COMPLEX THOUGH IT MIGHT APPEAR, THERE SEEMS TO BE NO DOUBT THAT IN THIS SECTION OF THE MARKET, DEREGULATION IS WORKING AS IT WAS INTENDED.

THERE IS CHOICE AND A VARIETY OF OPTIONS AND THE LARGE USERS HAVE BEEN ABLE TO "PLAY THE MARKET."

SOME CUSTOMERS HAVE DEALT DIRECTLY WITH PRODUCERS AND BROKERS AND SOME HAVE DEALT WITH THEIR DISTRIBUTOR WHICH HAS BEEN ABLE TO SECURE LOWER PRICES AND PASS THEM ON.

THE CHANGE IN BUYING HAS BEEN RATHER DRAMATIC.

AS AN EXAMPLE IN MY SYSTEM, CONSUMERS, WE SERVICE A MARKET OF SOME 300 BCF A YEAR.. OF THAT SOME 160 BCF IS LARGER VOLUME COMMERCIAL AND INDUSTRIAL USE SUBJECT TO DISCOUNTS NEGOTIATED WITH WGML.

OF THAT VOLUME, HOWEVER, SOME 50 BCF HAS CHOSEN TO GO DIRECT WITH BROKERS OR NON SYSTEM PRODUCERS, GENERALLY FOR LOWER PRICES --- ABOUT 30% OF THE R.V. MARKET OR 15% OF THE TOTAL.

I SHOULD POINT OUT THAT DEREGULATION IN THIS PARTICULAR MARKET SECTOR ALLOWED US TO ADDRESS THE ISSUE OF COMPETITION FROM OTHER FUELS.

THERE IS NO QUESTION THAT A NUMBER OF MAJOR GAS LOADS WERE UNDER THREAT FROM OTHER FUELS --- BASICALLY HEAVY OIL --- AND WHEN A GAS LOAD IS LOST TO A COMPETING FUEL, OBVIOUSLY THE ENTIRE INDUSTRY LOSES.

FROM THE DISTRIBUTORS' POINT OF VIEW, AND THAT OF OTHERS TOO I'M SURE, "DEREGULATION," "MARKET RESPONSIVE PRICING," (CALL IT WHAT YOU WILL) WAS ESSENTIAL TO MAINTAIN THAT MARKET SECTOR.

EROSION OF THE LARGE VOLUME MARKET, WHICH WAS THE MOST VULNERABLE ONE, WOULD HAVE HAD SOME SERIOUS COST IMPLICATIONS TO THE REMAINING RESIDENTIAL AND COMMERCIAL MARKETS.

BUT WHAT ABOUT THOSE RESIDENTIAL AND SMALLER COMMERCIAL AND INDUSTRIAL CUSTOMERS?

THE INTENT OF DEREGULATION WAS TO OPEN UP THE MARKET TO ALL CUSTOMERS, NOT JUST THE BIG ONES.

WHILE IT IS TRUE THAT HE HAS RECEIVED SOME BENEFITS,(PRIMARILY THROUGH RENEGOTIATED PRICE WITH WGML) ARE THEY THE SAME AS THOSE GAINED BY OTHERS?

IS HE NOT ENTITLED TO PARTICATE FULLY IN THE NEW OPEN MARKET SYSTEM.

THIS IS WHAT WAS INTENDED, BUT SO FAR IT HAS NOT BEEN ACCOMPLISHED.

THIS IS THE AREA WHERE THE PROBLEMS ARE.

THIS IS WHERE REALIZATION HAS NOT MATCHED EXPECTATION.

IN REALITY WE ARE STILL IN TRANSITION --- NO ONE SAID IT WOULD BE EASY --- AND THIS IS WHERE GOVERNMENTS ARE FINDING THEMSELVES DIRECTLY INVOLVED AND WHERE REGULATORS ARE HAVING A REAL STRUGGLE.

EVERYWHERE ONE TURNS THERE SEEMS TO BE ROADBLOCKS (OR PERHAPS BETTER DESCRIBED AS MOUNTAINS) TO BE OVERCOME.

THERE ARE SIGNIFICANT DIFFERENCES OF OPINION AND A POLARIZATION SEEMS TO HAVE DEVELOPED.

WITHOUT GOING THROUGH ALL THE DETAIL THERE IS A LONG LITANY OF ISSUES THAT HAVE STOOD IN THE WAY OF AN OPEN MARKET.

- LONG TERM CONTRACTS --- THEIR ENFORCEABILITY AND THEIR SANCTITY
- MARKET DEFINITION --- CORE --- NON CORE
- REMOVAL PERMITS
- SECURITY OF SUPPLY
- DISTRIBUTOR --- RIGHTS & OBLIGATIONS
- THE ROLE OF BROKERS ---- AND SO ON.

VERY SIMPLY, WE HAVE NOT YET FOUND A WAY TO BRING "DEREGULATION" (WHATEVER THAT IS) TO THE MAJORITY OF CANADIAN CUSTOMERS.

SOME OF THESE ISSUES ARE BEING ADDRESSED AND MAY BE DECIDED IN THE NEAR FUTURE, BUT IN THE MEANTIME THE INTERIM SOLUTIONS SEEM LEFT TO COMMERCIAL INTERESTS AND THE NEGOTIATING PROCESS.

AT PRESENT FREE ACCESS TO SUPPLY FOR DISTRIBUTORS IS LIMITED IN THE MAIN TO INCREMENTAL DISCRETIONARY VOLUMES.

FOR THE BULK OF SUPPLY TO THE SMALLER VOLUME MARKET, THE DISTRIBUTORS HAVE BEEN ABLE TO RENEGOTIATE THE PRICES PAID UNDER THE LONG TERM CONTRACTS WITH WGML.

THESE NEGOTIATIONS, WELL INTENTIONED AS THEY WERE, GAVE RISE TO SIGNIFICANT REGULATORY CONCERNS.

CONCERNS THAT THE REGULATORS' BASIC RESPONSIBILITY AND AUTHORITY TO APPROVE RATES WAS BEING USURPED.

THAT CONCERN --- AT LEAST IN ONTARIO --- IS STILL TO BE FINALLY ADDRESSED AND RESOLVED.

WHAT HAS HAPPENED HOWEVER IS THAT THERE HAS BEEN PRICE REDUCTION, SOME OF IT TO THE SO-CALLED "CORE MARKET" AND FURTHER NEGOTIATIONS WITH W.G.M.L. HOLD THE PROSPECT FOR EVEN FURTHER REDUCTIONS.

SOME OF THE EXPECTATION HAS BEEN ADDRESSED.

THESE NEGOTIATIONS ARE ALL VERY WELL AND GOOD, BUT IN THE MINDS OF MANY PEOPLE THEY ARE A POOR SUBSTITUTE FOR THE REAL THING --- OPEN ACCESS TO THE SUPPLY FOR ALL CUSTOMERS.

IF ONLY THE LARGE INDUSTRIAL CUSTOMERS ARE ABLE TO BENEFIT FROM DEREGULATION YOU KNOW THAT THERE WILL BE SERIOUS PROBLEMS AHEAD OF US.

I GO BACK TO WHAT I SAID ABOUT THE PUBLIC EXPECTATION, "DEREGULATION MEANS LOWER PRICE" --- NOT JUST FOR A FEW BUT FOR EVERYONE.

THAT MEANS THAT EITHER DIRECTLY, OR INDIRECTLY THROUGH THEIR DISTRIBUTOR, THEY MUST ALL HAVE A SHOT AT IT.

WE HAVEN'T FOUND THE WAY.

THERE ARE TWO AREAS OF CONCERN THAT HAVE CONSISTENTLY BEEN IDENTIFIED AS CRITICAL TO THE SUCCESSFUL IMPLEMENTATION OF THE NEW MARKET REGIME.

THEY ARE "FAIRNESS" AND "LONG TERM SECURITY."

"FAIRNESS" MEANS A NUMBER OF THINGS.

IN THE FIRST PLACE IT MEANS EQUAL PARTICIPATION IN THE NEW MARKET ENVIRONMENT FOR ALL CUSTOMERS. AND IT ALSO MEANS THAT THERE MUST BE

PROPER ALLOCATION AND RECOVERY OF COSTS FROM THOSE WHO USE THE SYSTEM, NO MATTER WHOSE GAS IT IS.

IN MANY RESPECTS THE LOCAL DISTRIBUTOR IS REALLY BEING ASKED TO BECOME NEUTRAL AS TO WHOSE GAS IS BEING DELIVERED THROUGH HIS SYSTEM.

AS A DISTRIBUTOR, I THINK WE CAN BECOME COMFORTABLE WITH THIS TRANSPORTATION ROLE WHICH IS DISTINCT FROM THE OTHER TRADITIONAL ROLE OF BUYER AND SELLER OF GAS.

ONE COULD ARGUE THAT AS LONG AS THE DISTRIBUTOR IS PAID APPROPRIATELY FOR DELIVERING GAS, IT DOESN'T REALLY MATTER WHOSE GAS IT IS THAT IS FLOWING ALONG THE PIPES AND THROUGH THE CUSTOMERS' METER.

HOWEVER, IF ANY CUSTOMER IS TO GAIN ADVANTAGE FROM MAKING HIS OWN ARRANGEMENTS TO BUY GAS DIRECTLY, IT MUST BE SOLELY ON THE MERIT OF THAT PURCHASE AND NOT AT THE EXPENSE OF OTHER CUSTOMERS WHO ARE PAYING FOR THE FULL SERVICE OF THE UTILITY.

I BELIEVE WE HAVE COME A LONG WAY WITH THIS SUBJECT.

THE SECOND ISSUE --- OF LONG TERM SECURITY --- HAS AN ASPECT OF FAIRNESS TO IT TOO.

MUCH OF THE ACTIVITY AND THE ATTENTION SURROUNDING DEREGULATION HAS CONCENTRATED ON THE SHORT TERM. I SENSE A FEELING --- DISAGREE WITH ME

IF YOU WISH --- OF "GET WHAT YOU CAN WHILE THE GOINGS GOOD --- WORRY ABOUT THE FUTURE WHEN IT COMES."

THAT APPLIES TO SOME, BUT NOT ALL CUSTOMERS AND SOME, BUT NOT ALL PRODUCERS.

CERTAINLY THE DISTRIBUTORS' PERSPECTIVE IS MORE OF A LONG TERM ONE.

WE ARE LONG TERM PLAYERS AND WE BELIEVE THE HEALTH OF THE INDUSTRY IS FIRMLY AND DIRECTLY LINKED TO LONG TERM STABILITY AND SECURITY.

THE INDUSTRY WAS BUILT ON THOSE TWO PREMISES AND THERE IS NO REASON TO THINK THAT THEY ARE ANY LESS IMPORTANT TODAY THAN THEY EVER WERE.

THIS STABILITY AND SECURITY WAS BUILT, AT LEAST IN LARGE MEASURE BY THE DISTRIBUTORS ACCEPTING RESPONSIBILITY FOR THE MARKET AND ITS DEVELOPMENT. THAT MARKET RESPONSIBILITY TRANSLATED INTO LONG TERM CONTRACTS WITH TCPL AND IN TURN WITH PRODUCERS.

IT WAS CERTAINLY REASONABLE IN A MARKET WHERE ALL GAS WAS SOLD THROUGH THE DISTRIBUTOR, BUT IS IT STILL REASONABLE TO DO THAT WHEN CUSTOMERS MAY, AT ANY TIME, CHOOSE TO BUY THEIR GAS FROM SOMEONE ELSE?

THAT IS NOT TO IMPLY THAT THE DISTRIBUTORS ARE THE ONLY LONG TERM PLAYERS --- THE TRANSMITTERS AND MANY OF THE PRODUCERS ARE ALSO IN THAT

CATEGORY --- BUT I AM CONCERNED THAT DEREGULATION HAS BROUGHT A VERY SHORT TERM AND PERHAPS EVEN SHORT-SIGHTED FOCUS ON THE INDUSTRY.

CUSTOMERS' EXPECTATIONS AND DEMANDS ARE FOR BENEFITS NOW WITH LITTLE OR NO THOUGHT FOR THE FUTURE CONSEQUENCES.

IN THE PAST, THE BUYING AND SELLING OF GAS, AS WELL AS THE DELIVERY OF GAS, WERE ALL ESSENTIAL FUNCTIONS OF THE UTILITY --- THE DISTRIBUTOR.

IT IS NOW CLEAR THAT THIS IS NO LONGER THE CASE. THE ONLY FUNCTION WHICH SEEMS CERTAIN TO REMAIN A MONOPOLY OF THE DISTRIBUTOR IS THE DELIVERY OF GAS TO THE ULTIMATE END USER.

IN THEORY, IF THE SYSTEM WORKS AS IT IS SUPPOSED TO, EVERY CUSTOMER WOULD HAVE A FREE MARKET TO SHOP IN AND THE DISTRIBUTOR WOULD DO WHAT HIS NAME IMPLIES --- DISTRIBUTE OR DELIVER GAS FOR A FEE WITHOUT ACTUALLY TAKING OWNERSHIP OF IT IN THE PROCESS.

ALL THAT IS VERY GOOD BUT HOW IS THE LONG TERM NEED SATISFIED.

IN THE PAST THERE WAS NEVER A QUESTION. IT WAS THE DISTRIBUTORS' ROLE AND HIS OBLIGATION TO ENSURE THAT THE LONG TERM SUPPLIES WERE AVAILABLE TO THE MARKET. IN MANY RESPECTS HE IS THE CUSTODIAN OF THE MARKET --- A LOGICAL ROLE.

WHAT IS CERTAIN IS THAT THE CANADIAN MARKET --- THE WHOLE CANADIAN MARKET, IS IMPORTANT AND SHOULD NOT BE ABANDONED.

SOMEONE HAS TO ENSURE THAT GAS IN AVAILABLE TO SERVE ALL MARKET NEEDS OVER THE LONG TERM OR WE RISK TURNING THE MARKET OVER THE THE COMPETITION BY DEFAULT.

THE RECENT NATIONAL ENERGY BOARD DECISION ON SURPLUS DETERMINATION RELAXED THE RULES TO ALLOW FOR GREATER FLEXIBILITY AND FREEDOM IN DEALING WITH EXPORT MARKETS.

I GATHER THAT THIS DECISION WAS WELCOMED BY THE PRODUCING SECTOR EVEN THOUGH IT WILL PROBABLY HAVE LITTLE IMMEDIATE EFFECT ON EXPORTS.

AT OUR END OF THE PIPELINE WE WILL CONTINUE TO STRESS THE NEED FOR ADEQUATE COMPETITIVELY PRICES SUPPLIES OF GAS TO OUR OWN DOMESTIC MARKET BEFORE WE SELL IT TO OUR FRIENDS IN THE U.S.

I UNDERSTAND AND APPRECIATE THE ASSURANCES OF SAFEGUARDS OUTLINED BY THE N.E.B.

FROM MY READING OF THE BOARD'S DECISION, THERE IS MUCH LATITUDE FOR INTERPRETATION, BUT I AM NEVERTHELESS PLEASED TO SEE THE BOARD'S ONGOING COMMITMENT TO ENSURE THAT THE INTERESTS OF CANADIAN CONSUMERS ARE PROTECTED IN THE YEARS TO COME.

JUST HOW WELL THIS WILL WORK IN PRACTICE, ONLY TIME WILL TELL.

LET ME ADVANCE ONE MORE THOUGHT FROM THE DISTRIBUTORS' PERSPECTIVE BEFORE I CONCLUDE MY REMARKS.

AT A MEETING OF THE ONTARIO NATURAL GAS ASSOCIATION TWO WEEKS AGO, I TOLD THAT GROUP THAT IN THE UNCERTAINTY AND CONFUSIONS OF THE LAST COUPLE OF YEARS I SOMETIMES HAD THE FRUSTRATING FEELING THAT WE WERE LOSING SIGHT OF THE REAL ISSUES --- LOSING SIGHT OF THE REAL CHALLENGE.

IT SEEMED TO ME THAT WE WERE SPENDING SO MUCH TIME AND ENERGY DEALING WITH THE CHANGING RULES AND STRUCTURE OF THE INDUSTRY THAT WE WERE FORGETTING WHAT THE REAL BATTLE WAS ALL ABOUT.

IN THIS OR ANY OTHER INDUSTRY, THE REAL FIGHT ALWAYS COMES DOWN TO MARKET SHARE AND GROWTH. THE MORE WE PROMOTE THE GROWTH OF THE TOTAL INDUSTRY, THE MORE OPPORTUNITY THERE IS FOR ALL THE PLAYERS TO PARTICIPATE AND BENEFIT.

I WOULD CERTAINLY EXPECT THAT THE FOUR OF US ON THIS PANEL MIGHT HAVE DIFFERING PERSPECTIVES OF THE PROBLEMS ASSOCIATED WITH DEREGULATION, BUT I WOULD HOPE THAT THIS IS SIMPLY A MATTER OF TAKING DIFFERENT PATHS AS WE CLIMB THE SAME HILL.

I THINK WE ALL REALIZE THAT EACH SEGMENT OF THE INDUSTRY IS DEPENDENT ON THE OTHER AND IN THE FINAL ANALYSIS, WE ARE ALL DEPENDENT ON THE MARKET.

WHAT IT COMES DOWN TO IS HARNESSING THE ENORMOUS ENERGY WE'VE ALL PUT INTO DEREGULATION DEBATE AND TO REDIRECTING IT TO OUR ULTIMATE TASK OF SELLING MORE GAS.

THANK YOU AND I LOOK FORWARD TO YOUR QUESTIONS.

"There are two times in a man's
life when he should not
speculate: When he can't afford
it, and when he can."

Mark Twain
Following the Equator, Vol. II,
Chapter XX

NOTES FOR AN ADDRESS

BY

THE HONOURABLE MARCEL MASSE

MEMBER OF PARLIAMENT FOR FRONTENAC AND

MINISTER OF ENERGY, MINES AND RESOURCES

AT THE INTERNATIONAL OIL AND

GAS MARKETS CONFERENCE

CALGARY, ALBERTA

SEPTEMBER 28, 1987

Check against delivery

PLAN

1. Introduction
2. Energy Ministers Meeting
3. Nature of the Energy Security Problem
4. Prospects of Another Oil Crisis
5. A Balanced Approach
6. Energy Megaprojects
7. Energy Options
8. Conclusion

1. Introduction

I AM VERY PLEASED TO BE BACK IN CALGARY. I HAVE BEEN IN ALBERTA SO MANY TIMES THIS YEAR THAT IT IS STARTING TO FEEL LIKE A HOME-AWAY-FROM-HOME FOR ME.

A FEW MONTHS FROM NOW, CALGARY IS GOING TO BE THE CENTRE OF WORLD ATTENTION AS THE HOST CITY OF THE NINETEEN-EIGHTY-EIGHT WINTER OLYMPIC GAMES. THE FIRST TIME THE WINTER GAMES HAVE EVER BEEN HELD IN CANADA. IT WILL BE A MAGNIFICIENT EVENT NOT ONLY FOR CALGARY AND ALBERTA, BUT FOR THE ENTIRE COUNTRY. WE WILL ALL BE PROUD OF YOU. I REMEMBER THE PRIDE WE ALL FELT IN MONTREAL WHEN THE SUMMER GAMES WERE STAGED IN QUEBEC IN NINETEEN-SEVENTY-SIX. I KNOW WESTERN CANADIANS WILL ALSO ENJOY THE EXHILARATION OF STAGING THE GREATEST SPORTING EVENT IN THE WORLD.

DANS QUELQUES MOIS, CALGARY ATTIRERA L'ATTENTION DU MONDE ENTIER. ELLE SERA L'HÔTE DES JEUX OLYMPIQUES D'HIVER DE 1988. C'EST UN ÉVÉNEMENT IMPORTANT, NON SEULEMENT POUR VOTRE VILLE ET VOTRE PROVINCE, MAIS POUR TOUT LE PAYS. JE ME SOUVIENS DE LA FIERTÉ QUE NOUS AVONS RESSENTIE LORSQUE LES JEUX OLYMPIQUES D'ETE DE MONTREAL SE SONT TENUS DANS MA PROVINCE NATALE, EN 1976, ET JE SERAI HEUREUX POUR LES CITOYENS DE CALGARY.

THE WINTER OLYMPICS WILL GIVE OUR ATHLETES A CHANCE TO DEMONSTRATE TO AN INTERNATIONAL AUDIENCE THEIR SKILLS AND OUR ORGANIZATIONAL ABILITIES. FROM THESE GAMES WILL COME MORE CANADIAN, -NAMES TO REMEMBER- LIKE THOSE OF NANCY GREEN, BARBARA ANNE SCOTT, GAETAN BOUCHER AND KEN REED. THERE WILL BE THRILLS AND SPILLS, AND NEW RECORDS WILL BE SET. YESTERDAY, I AM TOLD, THE SPEED SKATING OVAL WAS OFFICIALLY COMPLETED. SO EVERYTHING IS NEARLY READY AND I AM CONFIDENT THE PEOPLE OF CALGARY AND ALBERTA WILL WELCOME VISITORS FROM ALL PARTS OF CANADA AND FROM OVERSEAS WITH THE SAME COURTESY AND HOSPITALITY THEY HAVE EXTENDED TO ME ON MY MANY TRIPS HERE.

I AM DELIGHTED TO HAVE BEEN INVITED BY THE TWO SPONSORS OF THIS CONFERENCE -- THE CANADIAN ENERGY RESEARCH INSTITUTE AND THE CALGARY CHAMBER OF COMMERCE -- TO BE LUNCHEON SPEAKER TODAY AT THE SIXTH ANNUAL INTERNATIONAL OIL AND GAS MARKETS CONFERENCE. THE CONFERENCE ORGANIZERS CERTAINLY PUT TOGETHER AN AMBITIOUS PROGRAM -- ONE WHICH ADDRESSES A WIDE RANGE OF OIL AND GAS ISSUES, IMPORTANT BOTH TO CANADA AND THE INTERNATIONAL COMMUNITY.

MANY OF YOU ARE FROM OTHER COUNTRIES AND BRING DIFFERENT PERSPECTIVES TO BEAR ON OIL AND GAS ISSUES. GIVEN THE THEME OF THIS CONFERENCE , I THOUGHT YOU WOULD BE INTERESTED IN HEARING HOW WE IN THE PROGRESSIVE CONSERVATIVE GOVERNMENT VIEW THE ENERGY SECURITY ISSUE.

ENERGY SECURITY IS CLEARLY A QUESTION THAT HAS A MAJOR INTERNATIONAL DIMENSION. THE MEMBERS OF THE INTERNATIONAL ENERGY AGENCY HAVE RECOGNIZED THAT THEIR SECURITY DEPENDS FIRST AND FOREMOST ON EFFECTIVE COOPERATION BETWEEN THEM. EVEN NET OIL EXPORTERS -LIKE CANADA AND THE UK- AS A SUPER-POWER-LIKE THE USA- RECOGNIZE THAT THEIR INTERESTS ARE CLOSELY TIED TO THOSE OF OTHER INDUSTRIALIZED COUNTRIES AND THAT THEY ALONE CANNOT PROVIDE FOR THE FULL MEASURE OF THEIR SECURITY.

OF COURSE, THE ISSUE OF ENERGY SECURITY PRESENTS ITSELF DIFFERENTLY TO EACH COUNTRY DEPENDING ON ITS CIRCUMSTANCES. THE DRAMATIC FALL IN OIL PRICES IN 1985-1986 SPARKED A RE-EVALUATION OF THEIR ENERGY SECURITY BY COUNTRIES AROUND THE WORLD. WITHIN THE IEA, THIS LEAD TO A MINISTERIAL MEETING WHICH I CHAIRED IN PARIS LAST MAY.

MY SUBJECT TODAY IS THE EVOLUTION OF THE ENERGY SECURITY DEBATE IN CANADA. CANADA'S POTENTIALLY CHANGED CIRCUMSTANCES WITH LOWER PRICED OIL WERE SHOWN IN OUR NATIONAL ENERGY BOARD'S OCTOBER NINETEEN-EIGHTY-SIX REPORT ON CANADIAN ENERGY SUPPLY AND DEMAND. THAT REPORT SUGGESTED THAT CANADA WOULD BECOME INCREASINGLY DEPENDENT ON IMPORTED LIGHT CRUDE OIL DURING THE NEXT TWO DECADES. THE NEB FORESAW THAT WITH LOWER OIL PRICES DELIVERIES FROM WESTERN CANADA TO MONTREAL REFINERIES COULD DRY UP BY THE NINETEEN NINTIEES. AND ONTARIO REFINERIES, THE NEB SUGGESTED, COULD BECOME DEPENDENT ON IMPORTED CRUDE, FOR AT LEAST PART OF THEIR REQUIREMENTS, IF PRICES REMAINED VERY LOW.

2. ENERGY MINISTERS MEETING

THIS REPORT GAVE RISE TO A SERIOUS REEXAMINATION OF CANADA'S ENERGY SECURITY. IT WAS THE CENTRAL FOCUS WHEN I MET MY PROVINCIAL AND TERRITORIAL COLLEAGUES IN OTTAWA ON JANUARY THIRTY OF THIS YEAR. WE REALIZED AT ONCE THAT THERE WERE MANY VIEWS ABOUT THE PROBLEM. SO WE ESTABLISHED A FEDERAL-PROVINCIAL TASK FORCE TO STUDY IT FURTHER AND REPORT BACK TO US IN THE SUMMER.

SOME EXCELLENT PAPERS WERE PREPARED BY THE VARIOUS GOVERNMENTS AND THEY SET THE STAGE FOR A VERY SUCCESSFUL SECOND MINISTERIAL MEETING, HELP IN ST.JOHN'S, NEWFOUNDLAND ON AUGUST TWENTY FOUR. THE MOST STRIKING THING ABOUT THE DISCUSSION IN ST-JOHN'S WAS THE LARGE MEASURE OF CONSENSUS ON THE NATURE OF THE PROBLEM OF ENERGY SECURITY IN CANADA AND THE APPROPRIATE RESPONSE BY GOVERNMENTS. OF COURSE, THERE WERE DIFFERENCES BETWEEN US, BUT THEY WERE MORE DIFFERENCES OF EMPHASIS THAN OF PRINCIPLE. THEY SHOULD NOT OBSCURE THE EXTENT TO WHICH ALL GOVERNMENTS IN CANADA. FEDERAL AND PROVINCIAL, PRODUCERS AND CONSUMERS, EAST AND WEST - HAVE DEVELOPED A SET OF COMMON VIEWS ON A SUBJECT WHICH HAS BEEN VERY DIVISIVE IN OUR RECENT HISTORY. THIS NEW MEASURE OF CONCENSUS OWES A GREAT DEAL TO THE NEW OPENNESS AND UNDERSTANDING THAT I HAVE ENCOURAGED IN THE FEDERAL-PROVINCIAL DIALOGUE ON ENERGY.

3- NATURE OF THE ENERGY SECURITY PROBLEM

WHAT ARE THE ELEMENTS OF THIS EMERGING CONSENSUS? FIRST, MINISTERS AGREED THAT ENERGY SECURITY IS A SHARED OBJECTIVE WHICH RELATES TO ALL ENERGY COMMODITIES, BUT PARTICULARLY OIL. CANADA HAS MADE TREMENDOUS STRIDES OVER THE PAST DECADE IN DIVERSIFYING ENERGY PRODUCTION, BUT OIL REMAINS OUR MOST STRATEGIC ENERGY COMMODITY. OIL ACCOUNTS FOR MORE THAN ONE-THIRD OF THE ENERGY THAT THE CANADIANS CONSUME EVERY DAY. OUR TRANSPORTATION SECTOR RELIES ON OIL FOR VIRTUALLY ALL OF ITS NEEDS. IN ADDITION, OIL IS CANADA'S MAJOR ENERGY IMPORT. MORE THAN ANY OTHER ENERGY SOURCE, THE PRICE AND AVAILABILITY OF OIL TO CANADIANS REMAIN VULNERABLE TO FOREIGN DEVELOPMENTS OVER WHICH WE HAVE NO CONTROL.

SECONDLY, MINISTERS AGREED THAT THE INTERNATIONAL DIMENSION IS VITALLY IMPORTANT. ON A WORLD SCALE, CANADA IS A RELATIVELY SMALL PRODUCER AND CONSUMER OF OIL. ON OUR OWN, WE CANNOT POSSIBLY HOPE TO PREVENT A WORLD SUPPLY DISRUPTION NOR CAN WE DAMPEN AN EXCESSIVE PRICE SHOCK THAT COULD SPARK A RECESSION AND AS A TRADING NATION, WE CANNOT INSULATE OURSELVES FROM THE HEALTH OF THE GLOBAL ECONOMY.

THIRDLY, MINSITERS AGREED THAT WE MUST PURSUE ENERGY SECURITY IN A COST-EFFECTIVE MANNER. THIS MEANS A CAREFUL DEFINITION OF THE PROBLEM -PROTECTING OURSELVES FROM THE PHYSICAL DISRUPTION IN SUPPLIES AND A CAREFULREVIEW OF THE MEASURES TO DEAL WITH THAT. IT IS STRIKING IN THIS REGARD THAT THE CONSUMING PROVINCES DID NOT CALL FOR SHUTTING IN OIL NOR DIDTHE PRODUCING PROVINCES CALL FOR SUBSIDIZING THE PRODUCTION OF NON-ECONOMIC OIL.

FINALLY, AND THIS TOO IS IMPORTANT, MINISTERS RECOGNIZED THE DISTINCTION BETWEEN OIL SELF SUFFICIENCY AND OIL SECURITY. WHILE OIL SELF SUFFICIENCY HAS OBVIOUS ATTRACTIONS AND WOULD CONTRIBUTE TO ENERGY SECURITY, THE TWO SHOULD NOT BE CONFUSED. SELF-SUFFICIENCY WOULD NOT PROVIDE SECURITY AGAINST A GLOBAL RECESSION. NOR WOULD PURSUING SELF-SUFFIICIENCY IF IT WERE NOT ECONOMIC BE A COST EFFECTIVE WAY OF PROTECTING OUR ENERGY SECURITY.

4. PROSPECTS OF ANOTHER OIL CRISIS

LET ME TURN NOW TO THE LARGER CONTEXT WITHIN WHICH CANADA AND OTHER COUNTRIES MUST CONSIDER THEIR ENERGY SECURITY.

THE WORLD TODAY HAS SUBSTANTIAL EXCESS OIL CAPACITY THOUGH THERE ARE CERTAIN RISKS FREOM THE CURRENT SITUATION IN THE GULF.

EVEN IF A DISRUPTION IN OIL SUPPLIES DOES OCCUR, I BELIEVE THAT THE CONSUMING WORLD, AND INDUSTRIALIZED COUNTRIES IN PARTICULAR, ARE NOW BETTER ABLE TO DEAL WITH DISRUPTIONS THAN THEY WERE IN THE NINETEEN SEVENTIES. CONSIDERABLE PROGRESS HAS BEEN MADE IN REDUCING DEPENDANCY ON OIL AS A SOURCE OF ENERGY. AMONG THE INTERNATIONAL ENERGY AGENCY COUNTRIES, IT REPRESENTS ONLY SOME 46 % OF ENERGY CONSUMPTION, COMPARED TO SIXTY-THREE PER CENT IN NINETEEN-SEVENTY-THREE. AND IN ADDITION, THE INDUSTRIALIZED WORLD HAS ADDED SUBSTANTIAL DUAL-FIRED CAPACITY IN INDUSTRY AND HAS DEVELOPED MANY EMERGENCY PREPAREDNESS MEASURES.

BY TAKING A LONGER VIEW OF THINGS, WORLD MARKETS SEEM SHROUDED IN MYSTERY. WITH RESPECT TO SUPPLY, THE PROSPECTS FOR THE DEVELOPMENT OF NEW RESOURCES OUTSIDE OPEC ARE DEPENDENT UPON THE LEVEL OF DRILLING ACTIVITY IN CONVENTIONAL PRODUCING AREAS AND UPON THE IMPLEMENTATION OF HIGHER-COST PRODUCTION SYSTEMS. WHILE ADDITIONAL RESERVES WILL LIKELY BE DEVELOPED IN MANY PARTS OF THE WORLD, OPEC'S SHARE OF TOTAL PRODUCTIVE CAPACITY, AND OF WORLD OIL TRADE, WILL PROBABLY INCREASE THROUGH THE NINETEEN NINETIES.

I UNDERSTAND THAT MOST EXPERTS THINK WORLD OIL DEMAND WILL INCREASE GRADUALLY BETWEEN NOW AND THE END OF THE CENTURY. THE CURRENT EXCESS OF SOME NINE MILLION BARRELS A DAY IN GLOBAL OIL PRODUCTIVE CAPACITY --EQUIVALENT TO ABOUT ONE-QUARTER OF OECD CONSUMPTION -- IS LIKELY TO BE WORKED OFF SIGNIFICANTLY OVER THIS PERIOD. HOWEVER, INCREASING ENERGY EFFICIENCY, GROWTH IN THE USE OF NATURAL GAS AND ELECTRICITY AND THE EXPANSION OF ENERGY FUEL CHOICES ARE TRENDS THAT SEEM LIKELY TO CONTINUE.

CONSEQUENTLY, I BELIEVE THAT THE ENERGY WORLD OF THE NINETEEN NINETIES WILL BE ONE WHERE NO SINGLE FUEL DOMINATES AND WHERE TECHNOLOGY WILL INCREASINGLY ALLOW FUELS TO COMPETE WITH ONE ANOTHER IN A WIDER ARRAY OF USES. IT WILL BE ONE IN WHICH OPEC NATIONS WILL HAVE GREATER POWER TO INFLUENCE WORLD OIL PRICES THAN THEY DO TODAY. IN THESE CIRCUMSTANCES, WE MAY EXPECT SOME REAL PRICE INCREASES TO OCCUR. HOWEVER, OPEC'S DEGREE OF FREEDOM TO MANOEUVER WILL BE LIMITED BY THE ENHANCED FLEXIBILITY OF THE INTERNATIONAL ENERGY SYSTEM.

5. A BALANCED APPROACH

IF WE COULD PREDICT WITH CERTAINTY THE FUTURE COURSE OF INTERNATIONAL OIL PRICES AND MARKETS, WE COULD DECIDE VERY EASILY WHAT PRICE TO PAY FOR ENERGY SECURITY. HOWEVER, WE CANNOT AVOID SURPRISES. AT OUR RECENT MEETING IN AUGUST, CANADIANS ENERGY MINISTERS CONCLUDED THAT IT WOULD BE PRUDENT FOR CANADA TO PURSUE A POLICY BASED UPON A COST-EFFECTIVE AND BALANCED MIX OF EMERGENCY AND LONGER TERM MEASURES.

GIVEN THE SHORT-TERM AND SUDDEN NATURE OF WORLD OIL SUPPLY DISRUPTIONS, THERE IS A NEED FOR CANADA TO HAVE IN PLACE EMERGENCY MEASURES WHICH WILL ENABLE CANADIANS TO RESPOND TO DISRUPTIONS WHEN THEY OCCUR. CANADA ALREADY HAS AN EMERGENCY CAPABILITY. MY DEPARTMENT ESTIMATES THAT, WITH EXISTING SURGE PRODUCTION, FUEL SWITCHING CAPABILITIES AND VOLUNTARY RESTRAINT MEASURES, CANADA COULD NOW OFFSET AN IMPORT DISRUPTION EQUAL TO ABOUT EIGHT OR NINE PER CENT OF CURRENT OIL CONSUMPTION. THIS PERCENTAGE EXCEEDS THE REDUCTION IN WORLD PRODUCTION THAT WAS ACHIEVED BY ARAB OIL PRODUCERS AT THE PEAK OF THE 1973 EMBARGO. IT THUS REPRESENTS A SIGNIFICANT DEGREE OF FLEXIBILITY RELATIVE TO EVEN A LARGE MARKET DISRUPTION.

FURTHERMORE, WE HAVE, THROUGH THE ENERGY SUPPLIES ALLOCATION BOARD (ESAB), AN ORGANIZATION WHOSE "RAISON D'ÊTRE" IS TO ASSIST CANADA TO DEAL WITH EMERGENCY SITUATIONS. ESTABLISHED IN NINETEEN-SEVENTY-FOUR, THE BOARD IS RESPONSIBLE FOR PREPARING PLANS TO IMPLEMENT PROGRAMS TO ALLOCATE AVAILABLE OIL SUPPLIES AND RESTRAIN OIL DEMAND IN THE EVENT OF AN EMERGENCY. THEIR WORK IS, OF COURSE, TIED CLOSELY TO CANADA'S PARTICIPATION IN THE IEA EMERGENCY OIL SHARING SYSTEM. ALONG WITH OUR PARTNERS, CANADA IS NOW REVIEWING ITS EMERGENCY RESPONSE CAPABILITIES. PART OF THIS PROCESS WILL INVOLVE CONSIDERATION OF WHETHER TO ESTABLISH STRATEGIC PETROLEUM RESERVES IN ATLANTIC CANADA.

IN EXAMINING OUR NEED FOR ADDITIONAL MEASURES TO DEAL WITH THE RISK OF PHYSICAL DISRUPTIONS, WE OF COURSE ARE CONCERNED ABOUT THEIR COST-EFFECTIVENESS. DEMAND RESTRAINT MEASURES DURING AN EMERGENCY MIGHT INCLUDE VOLUNTARY EFFORTS SUCH AS CARPOOLING AND LOWERED THERMOSTATS, OR MANDATORY REQUIREMENTS TO CUT DOWN ON PERSONAL GAS CONSUMPTION OR FUEL SWITCHING IN THE INDUSTRIAL SECTOR. THE COST OF THESE MEASURES FOR THE ECONOMY MAY BE RELATIVELY LOW, TO THE EXTENT THAT THEY INVOLVE LARGELY DISCRETIONARY CONSUMPTION AND ARE SHORT TERM. MAINTAINING EMERGENCY OIL STOCKPILES IS ONE OPTION FOR DEALING WITH SUDDEN AND BRIEF DISRUPTIONS. A STUDY DONE BY MY DEPARTMENT ESTIMATED THAT THE CUMULATIVE COST BY THE YEAR TWO THOUSAND OF A STOCKPILE LARGE ENOUGH TO PROVIDE NINETY DAYS OF PROTECTION FOR TWENTY-FIVE PER CENT OF OUR NET OIL IMPORTS WOULD BE FIVE HUNDRED AND FORTY MILLION DOLLARS. SHUTTING IN OIL PRODUCTIVE CAPACITY THROUGH EXPORT CONTROLS TO ENHANCE SUPPLIES IN AN EMERGENCY WAS THE PREFERRED POLICY INSTRUMENT OF THE PREVIOUS LIBERAL GOVERNMENT OF CANADA. THE LAST POLICY OF THE NEW DEMOCRATIC PARTY IS TO RAPIDLY PHASE OUT EXPORTS OF BOTH OIL AND NATURAL GAS. IN FACT, IT IS ESTIMATED THAT SHUTTING IN PRODUCTION CAPACITY INVOLVES A COST TO CANADA THAT IS FIVE TO TEN TIMES LARGER THAN THE COST OF ESTABLISHING EMERGENCY OIL STOCKS. INCREASING THE CAPABILITY OF CANADIAN INDUSTRY AND TRANSPORTATION TO SWITCH FUELS ON SHORT NOTICE IN AN EMERGENCY MAY ALSO BE EFFECTIVE BUT IS LIMITED BY COSTS AND TECHNOLOGY.

WE ALSO NEED MEASURES THAT WILL REDUCE CANADA'S VULNERABILITY TO THE ADVERSE EFFECTS OF A SUPPLY DISRUPTION IN THE LONGER TERM. PROVINCIAL MINISTERS HAVE AGREED THAT CANADA OUGHT TO BUILD UPON ITS CONSIDERABLE ENERGY RESOURCES. WE RECOGNIZED THE NEED TO CONTINUE OUR EFFORTS TO INCREASE ENERGY SUPPLIES, PROMOTE GREATER ENERGY CONSERVATION, IMPROVE THE ENERGY TRANSPORTATION INFRASTRUCTURE, INCREASE THE USE OF ALTERNATIVE ENERGY FORMS, AND REDUCE BARRIERS TO ENERGY TRADE.

I BELIEVE THAT IT IS ALSO WORTH NOTING THAT CANADA'S ENERGY MINISTERS AGREED ON THE NEED TO PURSUE ENERGY SECURITY WITHIN A MARKET-ORIENTED POLICY FRAMEWORK. THIS DOES NOT MEAN THAT GOVERNMENTS SHOULD BE INDIFFERENT TO MARKET OUTCOMES. RATHER, WE MUST MAKE SURE THAT MARKETS WORK EFFICIENTLY AND THAT MARKET SOLUTIONS ARE EVALUATED WITHIN THE OVERALL OBJECTIVES OF GOVERNMENT POLICY. THIS, I MIGHT ADD, IS AN APPROACH TO ENERGY POLICY WHICH IS SHARED BY CANADA'S IEA ALLIES.

6. ENERGY MEGAPROJECTS

VERY LARGE ENERGY PROJECTS, THE SO-CALLED MEGAPROJECTS, REPRESENT A CASE IN POINT. AT OUR MEETING IN ST. JOHN'S, A NUMBER OF MY PROVINCIAL COLLEAGUES RAISED THE ISSUE OF GOVERNMENT ASSISTANCE TO SPECIFIC MEGAPROJECTS. SUCH VENTURES ARE GENERALLY CHARACTERIZED BY HIGH UP-FRONT CAPITAL COSTS, LONG LEAD TIMES AND HIGH RISKS. THESE FACTORS SOMETIMES COMBINE TO INHIBIT INVESTMENT BY THE PRIVATE SECTOR. WE IN THE GOVERNMENT OF CANADA RECOGNIZE THIS AND ACKNOWLEDGE THE CONTRIBUTION WHICH MEGAPROJECTS CAN MAKE TO OUR FUTURE ENERGY SUPPLY. WE ALSO APPRECIATE THE STIMULATIVE EFFECT WHICH LARGE PROJECTS CAN HAVE ON OUR ECONOMY, ON BOTH A REGIONAL AND NATIONAL LEVEL.

IN MY VIEW, GOVERNMENT MUST ENSURE THAT NON-CONVENTIONAL OIL AND GAS PROJECTS WILL PROCEED WHEN THEY ARE FUNDAMENTALLY ECONOMIC. ALL GOVERNMENTS, HOWEVER, HAVE A RESPONSIBILITY TO THEIR CITIZENS TO BE FISCALLY RESPONSIBLE AND TO MAKE THE BEST USE OF THE TAXPAYERS' DOLLARS. WE WILL EXAMINE REQUESTS FOR ASSISTANCE TO MEGAPROJECTS ON A CASE-BY-CASE BASIS ACCORDING TO THE CRITERIA WHICH I ANNOUNCED IN EDMONTON ON JUNE NINETEEN --ONE DAY AFTER THE GOVERNMENT'S WHITE PAPER ON TAX REFORM. WE HAVE COMMITTED OURSELVES TO DEVELOP THE NECESSARY MECHANISMS OUTSIDE THE TAX SYSTEM TO STIMULATE SUCH INVESTMENT IN ENERGY MEGAPROJECTS -- IN THE FRONTIERS, AND HEAVY OIL AND TAR SANDS REGIONS.

7. ENERGY OPTIONS

THE ENERGY OPTIONS PROCESS, WHICH I ANNOUNCED IN APRIL, IS EXPLORING THE FUTURE POTENTIAL OF ALL TYPES OF ENERGY AVAILABLE FOR CANADIAN USE INTO THE TWENTY FIRST CENTURY. THE FIRST CONFERENCE, HELD HERE IN CALGARY LAST JUNE, PRODUCED GENERAL AGREEMENT ON SOME BROAD GENERAL THEMES, INCLUDING:

- THE CONCEPT OF A MARKET-BASED ENERGY POLICY, PARTICULARLY AS IT RELATES TO INTERPROVINCIAL AND INTERNATIONAL TRADE;
- THE DESIRE FOR EQUITABLE TREATMENT AMONG ENERGY INDUSTRIES;
- THE INTEGRATION OF ENVIRONMENTAL CONSIDERATIONS AND VALUES IN ENERGY DECISION MAKING;
- SECURITY OF SUPPLY; AND
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- BALANCING THE INTEREST OF INDUSTRY, REGIONS, CONSUMERS AND NATIVE PEOPLE IN ENERGY POLICY PLANNING.

NONETHELESS, WE MUST NOT BE COMPLACENT ABOUT CANADA'S ENERGY FUTURE, DESPITE OUR IMMENSE ENERGY RESOURCE WEALTH. THE PROSPECTS ARE THAT INTERNATIONAL OIL MARKETS WILL REMAIN EXTREMELY VOLATILE IN THE NEAR TERM. WORLD PRICES COULD STABILIZE, DECLINE OR ESCALATE, DEPENDING ON ASSUMPTIONS MADE CONCERNING THE DEGREE OF OPEC SOLIDARITY, THE NATURE AND IMPACT OF HOSTILITIES IN THE PERSIAN GULF AS WELL AS ACTIONS TAKEN BY THE OIL CONSUMING NATIONS.

EN DEPIT DE NOTRE GRANDE RICHESSE À CET ÉGARD, IL NE FAUDRAIT NÉANMOINS PAS ÊTRE COMPLAISANT EN CE QUI A TRAIT À L'AVENIR DU CANADA SUR LE PLAN DE L'ÉNERGIE. ON PRÉVOIT QUE LE MARCHÉ DU PÉTROLE SERA EXTRÊMEMENT VOLATILE À COURT TERME. LES PRIX MONDIAUX POURRAIENT SE STABILISER, DÉCLINER OU GRIMPER, SELON L'OPINION QUE L'ON SE FAIT DE LA SOLIDARITÉ DES MEMBRES DE L'OPEP, DE LA NATURE ET DES RÉPERCUSSIONS DES HOSTILITÉS DANS LE GOLFE PERSIQUE, AUSSI BIEN QUE DES INITIATIVES DES PAYS CONSOMMATEURS DE PÉTROLE.

CANADA MUST THEREFORE BE PREPARED FOR ALL POSSIBLE MARKET EVENTUALITIES. GOVERNMENT AND INDUSTRY MUST CONTINUE THEIR COOPERATIVE EFFORTS TO ENHANCE CANADA'S ENERGY SECURITY AND TO DEVELOP OUR ENERGY RESOURCES IN A MANNER WHICH IN A WAY YIELDS THE GREATEST BENEFIT TO ALL CANADIANS. ENERGY OPTIONS IS JUST ONE ILLUSTRATION OF HOW WE ARE CONTINUING TO WORK TOGETHER TO ENSURE THAT CANADA'S ENERGY POLICIES WILL BE ABLE TO RESPOND APPROPRIATELY TO FUTURE DOMESTIC AND INTERNATIONAL DEVELOPMENTS. I AM PLEASED WITH THE PROGRESS WE'VE MADE SO FAR IN TERMS OF BRIGHTENING UP CANADA'S ENERGY SCENE. THE GOVERNMENT OF CANADA IS DETERMINED TO BUILD UPON THIS PROGRESS AND CANADA'S ENERGY STRENGTHS IN THE MONTHS AND YEARS AHEAD.

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THE EFFECTS OF THE NOVEMBER 1986 DEREGULATION OF THE CANADIAN GAS INDUSTRY
"THE MARKETER'S PERSPECTIVE"

Presented By:

D.W. Minion, P. Eng.
Chairman
Northridge Petroleum Marketing, Inc.
Calgary, Alberta

At
The Sixth Annual
International Oil and Gas Markets Conference
September 27-29, 1987
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THE COMPETITIVE MARKET FOR NATURAL GAS IN CANADA WAS FIRST REVEALED IN THE "AGREEMENT ON NATURAL GAS MARKETS AND PRICES" DATED OCTOBER 31, 1985. A COPY OF THIS DOCUMENT IS ATTACHED, AS IS A NEWS RELEASE DATED JULY 8, 1987, RENEWING THE COMMITTMENT TO THE FUNDAMENTAL PRINCIPLES EXPRESSED IN THE AGREEMENT.

THERE IS NO SUGGESTION IN THE AGREEMENT THAT TRANSMISSION AND DISTRIBUTION SYSTEMS UNDER FEDERAL AND PROVINCIAL REGULATORY CONTROL WOULD BE DEREGULATED. NOTE THAT THE CONSUMING PROVINCES OF MANITOBA, ONTARIO AND QUEBEC WERE NOT SIGNATORIES TO THE 1985 AGREEMENT. IT REMAINS THEIR RESPONSIBILITY TO ENSURE THAT THERE IS NO UNJUST TREATMENT OF GAS CONSUMERS BY THE UTILITIES UNDER THEIR CONTROL.

NOTE EVEN FURTHER, THAT THE FEDERAL ENERGY ADMINISTRATION ACT HAS NOT BEEN REPEALED OR AMENDED. THE FEDS RETAIN THE AUTHORITY TO RE-IMPOSE PRICING AND MARKETING CONTROL; THE ALBERTA ENERGY RESOURCES CONSERVATION BOARD STILL REQUIRES REMOVAL PERMITS (RECENTLY EXPANDED UNDER BILL 45) AND THE NATURAL GAS PRICING ADMINISTRATION ACT STILL ALLOWS ALBERTA TO SET AN ALBERTA BORDER PRICE FOR NATURAL GAS.

THE MOVE TO LESSEN REGULATION OF NATURAL GAS PRICES AND MARKETS VIA THE OCTOBER 1985 AGREEMENT SHOULD BE SEEN AS A GOOD FAITH AGREEMENT IN WHICH THE PARTIES AGREED TO NOT EXERCISE CERTAIN OF THEIR REGULATORY POWERS.

PERHAPS THE MOST EFFECTIVE WAY TO LOOK AT THE "MARKETERS PERSPECTIVE" OF THE DEREGULATION OF THE CANADIAN GAS INDUSTRY WOULD BE IN RELATION TO THE PRINCIPLES OUTLINED IN THE NEWS RELEASE AND TO DO THIS ON A POINT BY POINT BASIS.

PRINCIPLE 1 "Market responsive pricing set by negotiations between Buyers and Sellers."

TO HAVE MARKET RESPONSIVE PRICING, YOU MUST HAVE COMPETITION. FOR COMPETITION YOU NEED MANY BUYERS AND MANY SELLERS. YOU CAN NOT ACHIEVE MARKET RESPONSIVE PRICING THROUGH NEGOTIATIONS BETWEEN MONOPOLY SUPPLIERS AND MONOPOLY BUYERS. UP UNTIL 1985 ONE MAJOR SUPPLIER HAD AN EFFECTIVE MONOPOLY ON THE GAS MARKETS IN CANADA EAST OF SASKATCHEWAN, SELLING SOME 95% OF THE GAS CONSUMED. THAT FIGURE TODAY IS I BELIEVE ABOUT 75%. FROM A MARKETER'S PERSPECTIVE THEN WE STILL MUST COMPETE AGAINST A MONOPOLY SUPPLIER WHERE THE BULK OF THE GAS IS SOLD ABOVE MARKET RESPONSIVE PRICES. THIS ALLOWS THE MONOPOLY SUPPLIER TO LEVER THE ABOVE MARKET PRICE GAS INTO THE REMAINDER OF THE MARKET.

PRINCIPLE 2 "Open transportation access"

THIS ITEM NEEDS TO BE ADDRESSED FOR BOTH THE TRANSMISSION AND DISTRIBUTION SYSTEMS.

THE AVAILABILITY OF AN NEB ORDER UNDER SECTION 59(2) OF ITS ACT HAS EFFECTIVELY RESULTED IN OPEN ACCESS ON TRANSMISSION SYSTEMS, NOTWITHSTANDING THE RECENT NEB DECISION REGARDING MANITOBA OIL AND GAS CORPORATION'S REQUEST FOR A 59(2) ORDER. FOR GAS BEING EXPORTED TO THE UNITED STATES, ALL SYSTEM SUPPLIERS, (IE. TCPL, PAN ALBERTA, ALBERTA & SOUTHERN, WESTCOAST) HAVE EFFECTIVE ACCESS TO U.S. MARKETS WITHIN THE LIMITS OF THEIR PIPELINE CONTRACTS. FOR INDEPENDENT MARKETERS THERE IS VERY LITTLE ACCESS TO THE U.S. MARKET BECAUSE THE U.S. TRANSPORTATION SYSTEMS ARE NOT OPEN.

WITHIN CANADA, THE REGULATORY BOARDS IN MANITOBA, ONTARIO AND QUEBEC ARE ALL IN THE HEARING PROCESS TO PROVIDE ACCESS TO THE DISTRIBUTION SYSTEMS BY MARKETERS. IN ONTARIO, ANY SALE OF GAS, (EXCLUDING THOSE OF THE DISTRIBUTION COMPANY) REQUIRES A CERTIFICATE OF PUBLIC CONVENIENCE AND NECESSITY AND THESE SHOULD BE AVAILABLE BY YEAR END.

PROGRESS RELATING TO THIS PRINCIPLE HAS BEEN GOOD BUT INDEPENDENT MARKETS WILL NOT BE ABLE TO COMPETE ON EQUAL FOOTING WITH SYSTEM SUPPLIERS UNTIL 1988.

PRINCIPLE 3 "Respect by Governments for existing contracts."

THE ISSUE OFTEN RAISED HERE REGARDS SANCTITY OF CONTRACT. HISTORICALLY, THE RELATIONSHIP BETWEEN THE PRODUCER, THE TRANSMISSION COMPANY, AND THE DISTRIBUTION COMPANY HAS INVOLVED LONG TERM CONTRACTS, TYPICALLY 15 TO 20 YEARS DEPENDING ON REQUIREMENTS FOR FINANCING AND NEEDS OF BONDHOLDERS. HOWEVER AND MOST IMPORTANTLY, THERE HAVE BEEN NO LONG TERM CONTRACTS BETWEEN CONSUMERS AND DISTRIBUTION COMPANIES EXCEPT FOR A VERY FEW INDUSTRIAL CONTRACTS THUS THE

SANCTITY OF CONTRACTS ISSUE IS MUTE AT THIS POINT. FURTHER THE REGULATORY BOARDS IN THE INDIVIDUAL PROVINCES HAVE JURISDICTION OVER THE RELATIONSHIP BETWEEN THE CONSUMER AND THE DISTRIBUTION COMPANY. THE ATTEMPT TO DEFINE A CORE MARKET FOR ACCESS PURPOSES TO THAT MARKET IS NOTHING MORE THAN AN ATTEMPT TO IMPOSE A DEFACTO CONTRACT ON THE CONSUMER. ALBERTA MAY HAVE AUTHORITY TO DO THIS IN ALBERTA BUT THAT IS THE ONLY PLACE.

RESPECT BY GOVERNMENTS FOR EXISTING CONTRACTS DOES NOT MEAN AND CAN NOT MEAN RESPECT FOR CONTRACTS THAT DO NOT EXIST.

PRINCIPLE 4 "Greater access to markets for Producers - Domestic and Export."

YOU CANNOT HAVE A COMPETITIVE MARKET WITHOUT ACCESS TO CONSUMERS BY PRODUCERS OR MARKETERS. THE INDEPENDENT PRODUCER HAD LITTLE OR NO ACCESS TO EASTERN CANADIAN MARKETS AT ALL FROM 1977/78 TO 1985/86. DURING THIS PERIOD PRICES MANDATED BY GOVERNMENTS SHARPLY CURTAILED DEMAND AND TCPL, (THE MONOPOLY SUPPLIER) DID NOT CONTRACT FOR GAS. INSTEAD IT RAN INTO A SERIOUS TAKE OR PAY PROBLEM. WITHIN THE LAST YEAR AND IN RESPONSE TO PRESSURE FROM THE PRODUCING PROVINCES, THE FEDERAL GOVERNMENT ESTABLISHED AN INCENTIVE PROGRAM FOR THE EXPLORATION AND DEVELOPMENT OF OIL AND GAS CALLED CEDIP, PARTICULARLY DIRECTED AT THE SMALLER COMPANIES. ONE WOULD ASSUME THAT ACCESS TO MARKETS IS A PREROGATIVE OF ANY EXPLORER TAKING ADVANTAGE OF CEDIP. OTHERWISE WHAT IS THE PURPOSE OF THE PROGRAM.

PRINCIPLE 5 "Greater access to gas supplies for Consumers."

TO HAVE WORKABLE COMPETITION, CONSUMERS NEED NON DISCRIMINATORY ACCESS TO SUPPLIES. THE QUESTION IS DOES THIS REFER TO ALL CONSUMERS OR JUST ONES WHOSE CONSUMPTION IS GREATER THAN 35 000 GJ/YEAR, A LIMIT WHICH NOW APPEARS TO BE

APPLIED TO GRANTING OF REMOVAL PERMITS. THE PRINCIPLE SUGGESTS IT IS THE CUSTOMER THAT SHOULD DECIDE THE TYPE OF SUPPLY AND SECURITY OF SUPPLY IT NEEDS.

PRINCIPLE 6 "Less Government regulation and control within the marketplace."

WITH TWO MAJOR EXCEPTIONS, THIS APPEARS TO BE HAPPENING. THE CONSUMING PROVINCES ARE LESSENING CONTROL. WHERE PRICES ARE ESTABLISHED ON A COMPETITIVE BASIS THEY DO NOT INTERFERE. HOWEVER, THE PASSING OF BILL 45 BY ALBERTA IS A MOVE TO INCREASE CONTROL AND IN FACT IT DISCRIMINATES AGAINST INDEPENDENT MARKETERS AND PRODUCERS. THESE PARTIES MUST NOW OBTAIN AN INDIVIDUAL REMOVAL PERMIT WITH ALL COMMERCIAL ASPECTS SUBJECT TO MINISTERIAL CONSENT, WHILE SYSTEM GAS SELLERS CAN SELL GAS TO INDIVIDUAL CUSTOMERS UNDER LONG TERM REMOVAL PERMITS WITHOUT SO MUCH AS A WINK OF THE EYE IN OBTAINING MINISTERIAL CONSENT.

CURRENT ATTEMPTS TO DEFINE AND INTRODUCE A CORE MARKET CONCEPT IS STRONGLY AT ODDS WITH THIS PRINCIPLE.

PRINCIPLE 7 "An orderly transition from the regulated world to the deregulated environment that is fair to both Producers and Consumers."

FAIRNESS TO PRODUCERS WOULD IMPLY NON DISCRIMINATORY ACCESS TO MARKETS AND COMPETITIVE PRICES.

FAIRNESS TO CONSUMERS WOULD IMPLY NON DISCRIMINATORY ACCESS TO SUPPLIES AND COMPETITIVE PRICES.

ORDERLINESS IMPLIES PREDICTABILITY AND PROGRESS IN THE DIRECTION DESIRED. SO FAR THERE HAS BEEN GENERAL ORDERLINESS EXCEPT FOR THE IMPOSITION OF MORE STRINGENT REMOVAL PERMIT CONDITIONS AND THE POTENTIAL ESTABLISHMENT OF A PROTECTED CORE

MARKET. IT HAS NOW BEEN TWO YEARS SINCE THE AGREEMENT WAS IMPLEMENTED AND IN A COMMODITY MARKET THE PROGRESS WHICH HAS BEEN ACHIEVED HAS BEEN ORDERLY.

PRINCIPLE 8 "A regime that will have favourable impacts on investment and employment and trade of which would provide energy security for all Canadians."

GIVEN THE FACT THAT THE AGREEMENT WAS SIGNED BY THOSE PROVINCES WHICH HAVE THE MOST TO GAIN BY INVESTMENT AND EXPLORATION ACTIVITY, ONE COULD ASSUME THAT THIS PRINCIPLE IS BEST ACHIEVED THROUGH THE MARKET SYSTEM ESPOUSED BY THE AGREEMENT. IN TERMS OF ENERGY SECURITY THIS IS BEST ACHIEVED BY HAVING AN INDUSTRY CAPABLE OF PRODUCING ADEQUATE SUPPLIES OF ENERGY AT MARKET RESPONSIVE PRICES. PRICE IS THE MOTIVATING FORCE FOR THE ACCOMPLISHMENT OF THIS PRINCIPLE.

FROM THIS MARKETER'S PERSPECTIVE WE HAVE MADE MEASURED PROGRESS TOWARD A SYSTEM OF WORKABLE COMPETITION IN THE BUYING AND SELLING OF NATURAL GAS IN CANADA. SUCH A SYSTEM WILL NEVER BE PERFECT CONSIDERING THE PLACE FROM WHICH WE STARTED, NAMELY A HIGHLY REGULATED ENVIRONMENT WHEREIN THE PRICES FOR THE COMMODITY WERE MANDATED BY GOVERNMENT DECREE. IF GAS IS TO BE MERCHANDIZED AS A COMMODITY THEN IT SEEMS THAT WE CANNOT HAVE A BODY STANDING IN THE MIDDLE PASSING JUDGEMENT ON THE COMMERCIAL ASPECTS OF EACH DEAL, AS PRESENTLY HAPPENS WHEN ONE APPLIES FOR A REMOVAL PERMIT. MARKETERS NEED NON DISCRIMINATORY ACCESS TO SUPPLY, TO CONSUMERS AND TRANSPORTATION. WE ALSO NEED EQUITABLE ACCESS TO REGULATORY AND POLITICAL APPROVALS.

Canada

Agreement on Natural Gas Markets and Prices

AGREEMENT AMONG THE GOVERNMENTS OF CANADA, ALBERTA, BRITISH COLUMBIA AND SASKATCHEWAN ON NATURAL GAS MARKETS AND PRICES

INTENT

1. In the Western Accord of March 28, 1985 on Energy Pricing and Taxation, the governments of Canada, Alberta, British Columbia and Saskatchewan agreed that a more flexible and market-oriented pricing regime was required for the domestic pricing of natural gas. The present Agreement is intended to create the conditions for such a regime, including an orderly transition which is fair to consumers and producers and which will enhance the possibilities for price and other terms to be freely negotiated between buyers and sellers. This will have favourable effects on investment, employment and trade and will provide energy security for all Canadians.

PRINCIPLES

2. Effective November 1, 1986, the prices of all natural gas in interprovincial trade will be determined by negotiation between buyers and sellers. Access will be immediately enhanced for Canadian buyers to natural gas supplies and for Canadian producers to natural gas markets while at the same time assuring that the reasonably foreseeable requirements of gas for use in Canada are protected.

3. The twelve month period commencing November 1, 1985 is the transition to a fully market sensitive pricing regime. While prices will continue to be prescribed by governments, immediate steps will be taken to enable gas consumers to enter into supply arrangements with gas producers at negotiated prices (direct sales), which prices will then promptly be endorsed by governments in the context of the administered system. After this transition period, purchase and sale of natural gas will be freely negotiated, and prices will no longer be prescribed.

4. It is the intention of the parties to the Agreement to foster a competitive market for natural gas in Canada, consistent with the regulated character of the transmission and distribution sectors of the gas industry. In this regard the governments commit, without qualification, that once the transition to the new marketing and pricing system is completed, the system will stay in place for the foreseeable future.

DOMESTIC NATURAL GAS SALES

A. Direct Sales and Competitive Market Programs

5. Effective November 1, 1985, consumers may purchase natural gas from producers at negotiated prices, either directly or under buy-sell arrangements with distributors, provided distributor contract carriage arrangements are available in respect of such purchases. This provision is in no sense intended to interfere with provincial jurisdiction in regard to regulation of gas distribution utilities.

6. For the period November 1, 1985 to October 31, 1986 consumers who seek release from existing contractual arrangements with distributors shall be eligible to purchase natural gas from producers at negotiated prices, as described in paragraph 5 above, only where the producers supplying the gas under the existing contractual arrangements have agreed to such release.

7. To enable the market-responsive pricing system to operate within the intent of this Agreement, the governments request the National Energy Board to review the following concerns:

   i) whether inappropriate duplication of demand charges will result from possible displacement of one volume of gas by another; and

   ii) whether the policy regarding the availability of T-Service, as outlined in the Board's latest TransCanada PipeLines toll decision is still appropriate, taking into account, among other things, interested parties' views on the fair and equitable sharing of take-or-pay charges.

8. Effective November 1, 1985, competitive marketing programs (CMP) to meet special market requirements may be negotiated between distributors, shippers and the producers who are providing the natural gas volumes associated with such programs.

9. A consumer purchasing natural gas under a direct sale or a competitive marketing program must waive eligibility for payments under the Natural Gas Market Incentive Program (NGMIP), for those volumes taken under the direct sale or CMP.

B. New Sales to Distributors

10. Effective November 1, 1985, a distributor may under new or renegotiated contracts, purchase natural gas from shippers or directly from producers at negotiated prices. Notwithstanding such an arrangement, prior to November 1, 1986, the distributor shall take the full volumes of gas committed under existing contracts before accepting the delivery of any volumes of gas under a new contract.

C. Existing Sales to Distributors

11. The price of gas delivered under existing shipper-distributor contracts shall remain at $2.79804 per gigajoule at the Alberta border for the period November 1, 1985 to October 31, 1986.

12. The National Energy Board has approved for implementation November 1, 1985, an increase in TransCanada PipeLines' (TCPL) transportation tolls. In order to maintain the Alberta Border Price and the Toronto Wholesale Price at their current levels, and to allow TCPL to recover its approved costs for the transportation of natural gas consumed in domestic markets, the Government of Canada agrees to pay an amount equal to the value of revenues foregone over

the period November 1, 1985 to October 31, 1986. These payments will be made under a Transportation Assistance Program financed by an extension of the Market Development Incentive Program (MDIP) to October 31, 1986.

13. Prior to November 1, 1986, negotiations shall commence between distributors, shippers and the producers supplying the gas in question respecting the price to be paid for natural gas delivered under existing contracts. Prices resulting from such negotiations shall come into effect November 1, 1986 and as agreed thereafter. Where contract renegotiation between buyers and sellers, whether of price or volume, takes place in good faith and on a voluntary basis, governments will not obstruct the resulting commercial transactions.

14. In the absence of an Agreement between a shipper and a distributor, or a producer and a shipper, on the price to be paid for gas under existing contracts on November 1, 1986, and thereafter, the price shall be determined through arbitration.

15. With respect to gas produced in Alberta, the Government of Alberta intends to amend the Arbitration Act. The amendment would enable pricing disputes between producers and purchasers to be arbitrated under the act or under alternative arrangements established by contract between the parties. The amendments will ensure that the arbitration of pricing disputes is done in an impartial and equitable manner consistent with the policy of implementing a more market-responsive domestic gas pricing system. Specifically, the Government of Alberta commits to amend Section 17 of the act to permit the arbitrator to take into account all relevant factors required to arrive at a fair decision on the price of the natural gas in question.

EXPORT NATURAL GAS SALES

16. The governments anticipate that reviews of surplus tests underway or shortly to be initiated by the National Energy Board and by the appropriate provincial authorities will result in significantly freer access to domestic and export markets and thus will contribute to the achievement of the market-oriented pricing system contemplated in this Agreement.

17. Effective November 1, 1985, the Government of Canada will take appropriate steps to amend its existing policy on short term export sales of natural gas. Specifically:

    i) the "incrementality test" shall be eliminated;

    ii) the "competing fuels test" shall be eliminated; and

    iii) the National Energy Board VI Regulations, Section 8 shall be amended to allow the export of natural gas by order without volume limitation for terms not exceeding 24 months.

18. Effective November 1, 1985, the Government of Canada will amend its policy in regard to the conditions exporters of natural gas must meet for gas exported under licence. To obtain approval, all licence holders must demonstrate that their negotiated contractual arrangements meet the following criteria:

i) the price of exported gas must recover its appropriate share of costs incurred;

ii) the price of exported natural gas shall not be less than the price charged to Canadians for similar types of service in the area or zone adjacent to the export point;

iii) export contracts must contain provisions which permit adjustments to reflect changing market conditions over the life of the contract;

iv) exporters must demonstrate that export arrangements provide reasonable assurance that volumes contracted will be taken; and

v) exporters must demonstrate that producers supplying gas for an export project endorse the terms of the export arrangement and any subsequent revisions thereof.

19. The Government of Alberta agrees that the export flowback system shall continue in its current form, subject to the actions contemplated in paragraph 12, until November 1, 1986, at which time the system will be eliminated.

NATURAL GAS IMPORTS

20. There is provision for the import of natural gas in the National Energy Board Act and Regulations.

GENERAL APPLICATION

21. The Government of Canada has broad responsibilities to ensure that trade among provinces and between Canada and its foreign trading partners is conducted in a manner which will provide benefits for all Canadians. Nothing in this Agreement shall limit Canada's power or its ability to meet its responsibilities in relation to interprovincial and international trade.

22. The governments of Alberta, British Columbia and Saskatchewan have broad responsibilities with respect to the development of their natural resources. Nothing in this Agreement shall limit the producing provinces' powers or their ability to meet their responsibilities in relation to their ownership and management of their natural resources.

23. The producing provinces shall retain their right to condition the removal of natural gas from the province to protect provincial public interest. Notwithstanding this basic right of ownership, the producing provinces do not intend to use this right to frustrate the intent of this Agreement. Specifically:

i) Alberta and British Columbia will initiate a review of their respective surplus tests to ensure that the tests will contribute to the achievement of the market-oriented pricing system contemplated in this Agreement.

ii) Alberta will review the wording of the Gas Resources Preservation Act, specifically Section 5(3)(c), and as necessary, intends to amend the legislation to ensure that it does not require new sales to be incremental to existing sales prior to November 1, 1986.

iii) Saskatchewan, in order to decrease its reliance on extraprovincial sources of gas, will permit limited quantities of its gas for sale outside the province and for direct sale within the province, as a market incentive to stimulate exploration of conventional resources. So long as Saskatchewan is reliant on extraprovincial gas, the price of gas sold outside the province shall be not less than the price at which gas may be purchased in Saskatchewan.

24. Non-arm's-length sales of natural gas between producers and shippers, between producers and distributors, or between producers and consumers shall be subject to appropriate provincial legislation for purposes of determining and collecting royalty or mineral tax revenues payable to the respective provincial Crown.

25. In conjunction with the transition to a more flexible and market-oriented pricing regime for domestic natural gas sales, the governments agreed that an early and all-encompassing review of the role and operations of interprovincial and international pipelines engaged in the buying, selling and transmission of gas is in order. Towards this end, the parties agree that the review will be carried out by an impartial panel appointed by the Minister of Energy, Mines and Resources in consultation with the ministers representing the governments of Alberta, British Columbia and Saskatchewan. The review shall be completed no later than June 30, 1986 and a final report submitted to the Minister of Energy, Mines and Resources on or before July 31, 1986. The details of panel membership, mandate and reporting relationship will be made public separately.

CONSUMING PROVINCES

26. It is anticipated that the governments of the consuming provinces who are not signatories to this Agreement will make changes to ensure the effectiveness of the market-sensitive gas pricing regime, including legislative changes and the provision of direction to provincial agencies to provide consumers with alternative sources of supply through the availability of transportation services on distribution systems, and to provide distributors with greater flexibility in determining prices for gas sold by them.

MONITORING

27. To ensure that the intent and objectives of this Agreement are achieved, a senior official representing each of the parties to this Agreement shall be appointed to monitor the implementation of the provisions contained herein and, among other things, the degree to which regulatory processes have resulted in significantly freer market access. These officials shall report their findings on a quarterly basis to their respective ministers.

28. The parties to this Agreement intend to enact expeditiously the appropriate legislative and regulatory changes necessary to implement the market-oriented pricing policy contemplated herein.

Dated on this 31st day of October, 1985.

For the Government of Canada

Pat Carney
Minister of Energy, Mines and Resources

For the Government of Alberta

John Zaozirny
Minister of Energy and Natural Resources

For the Government of British Columbia

Stephen Rogers
Minister of Energy, Mines and Petroleum Resources

For the Government of Saskatchewan

Paul Schoenhals
Minister of Energy and Mines

NEWS RELEASE ISSUED BY

THE HONOURABLE MARCEL MASSE,

MINISTER OF ENERGY, MINES AND RESOURCES CANADA;

THE HONOURABLE NEIL WEBBER,

ALBERTA ENERGY MINISTER;

THE HONOURABLE JACK DAVIS,

MINISTER OF ENERGY, MINES AND PETROLEUM RESOURCES,

BRITISH COLUMBIA; AND

THE HONOURABLE PAT SMITH,

MINISTER OF ENERGY AND MINES, SASKATCHEWAN

CALGARY, ALBERTA

JULY 6, 1987

87/175
July 6, 1987

NEWS RELEASE

CALGARY – A meeting of the four Ministers in Calgary representing signatories of the Western Accord and the subsequent agreement on Natural Gas Markets and Prices renewed their commitment to the fundamental principles as expressed in the Agreement on Natural Gas Markets and Prices.

These may be summarized as:

1. Market responsive pricing set by negotiations between buyers and sellers.
2. Open transportation access.
3. Respect by Governments for existing contracts.
4. Greater access to market for producers – domestic and export.
5. Greater access to gas supplies for consumers.
6. Less Government regulation and control within the marketplace.
7. An orderly transition from the regulated world to the deregulated environment that is fair to both producers and consumers.
8. A regime that will have favourable impacts on investment, and employment and trade and which would provide energy security for all Canadians.

The four Ministers agree that:

1. Adherence to the fundamentals of the Agreement regarding respect for existing contracts and market access is crucial to deregulation.
2. Governments remain committed to the deregulation process as long as it is fair to all segments of the industry.
3. Unilateral action by Governments or by their regulatory agencies could jeopardize the deregulation process.
4. In recognition of the particular needs of different categories of end-users they will explore ways in which the producing and consuming provinces can reach a consensus on the definition of the core market.

Government in consultation with industry will immediately commence a dialogue to resolve outstanding issues. This process will involve both producing and consuming provinces as well as the federal government.

TRANSCANADA PIPELINES LIMITED

OPERATING DEMAND VOLUMES (OD)

($10^3m^3/d$)

Shipper/Buyer	Toll Schedule	Toll Zone and Delivery Area	OD	End-User	Effective Date of OD
Saskatchewan Power Corporation	CD-S	Saskatchewan - SSDA	285.0	Note 1	July 1, 1987
ICG Utilities (Manitoba) Ltd.	CD-S	Saskatchewan - SSDA	225.0	Note 1	July 1, 1987
ICG Utilities (Manitoba) Ltd.	CD-M	Manitoba - MDA	1 403.0	Note 1	July 1, 1987
ICG Transmission Holdings Ltd.	CD-M	Manitoba - MDA	350.0	Note 1	July 1, 1987
Greater Winnipeg Gas Co.	CD-M	Manitoba - MDA	7 170.0	Note 1	July 1, 1987
ICG Utilities (Ontario) Ltd.	CD-W	Western - WDA	2 335.0	Note 1	July 1, 1987
ICG Utilities (Ontario) Ltd.	CD-N	Northern - NDA	3 508.0	Note 1	July 1, 1987
Gaz Metropolitain, inc.	CD-N	Northern - NDA	202.0	Note 1	July 1, 1987
ICG Utilities (Ontario) Ltd.	CD-N	Northern - SSMDA	1 340.0	Note 1	July 1, 1987
ICG Utilities (Ontario) Ltd.	CD-E	Eastern - CDA	290.0	Note 1	July 1, 1987
Consumers' Gas Co. Ltd.	CD-E	Eastern - CDA	9 768.5	Note 1	July 1, 1987
			9 748.0		July 8, 1987
			9 730.4		July 14, 1987
			9 619.4		Aug. 1, 1987
Union Gas Limited	CD-E	Eastern - CDA	5 443.2	Note 1	July 1, 1987
			5 432.2		July 8, 1987
			5 382.2	Note 6	July 31, 1987
			5 359.2	Note 6	Aug. 1, 1987
ICG Utilities (Ontario) Ltd.	CD-E	Eastern - EDA	1 805.0	Note 1	July 1, 1987
Kingston Public Utilities Commission	CD-E	Eastern - EDA	209.0	Note 1	July 1, 1987
Consumers' Gas Co. Ltd.	CD-E	Eastern - EDA	4 382.2	Note 1	July 1, 1987
			4 372.6		July 14, 1987
			4 285.4		Aug. 1, 1987
Gaz Metropolitain, inc.	CD-E	Eastern - EDA	7 247.3	Note 1	July 1, 1987
Trans Quebec & Maritimes Pipeline Inc.	CD-E	Eastern - EDA	1 180.3	Note 1	July 1, 1987

ENERGY DEVELOPMENT IN MALAYSIA

Presented by
YB Dato' Murad Hashim
Senior Vice-President (Downstream)
Petroliam Nasional Berhad
Kuala Lumpur, Malaysia

At
The Sixth Annual
International Oil and Gas Markets Conference
September 27-29, 1987
Calgary Convention Centre
Calgary, Alberta

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ENERGY DEVELOPMENT IN MALAYSIA

Presented By

YB Dato' Murad Hashim
Senior Vice-President (Downstream)
Petroliam Nasional Berhad
Kuala Lumpur, Malaysia

A. INTRODUCTION

It certainly is an honour for me to have been invited to Calgary to address this distinguished gathering of people in the energy field. May I, at the outset, take this opportunity to thank the Canadian Energy Research Institute (CERI) for having invited PETRONAS' participation at this Conference. In the course of my presentation, I hope to share with you some of our thoughts on energy in Malaysia while discussing the progress we have made in harnessing our energy resources to meet development objectives.

Events in the international energy scene in the last fifteen years or so have led nations to realise the importance of security of supply of energy resources. The sharp oil price escalation in the seventies led to a global rejuvenation in replenishment of energy supplies. Conservation measures and concerted efforts to achieve fuel efficiency in energy utilisation in the household, industrial and transportation sectors were given higher priority.

The high oil prices, besides promoting oil supplies from non-OPEC sources, gave impetus to the development of non-oil energy supplies in the form of natural gas, coal, hydropower and nuclear energy.

Events in the international energy scene since the early '80s, however, appear to have reversed the earlier concerted global efforts to meet the urgent need for energy supply replenishment. The economic recession since the beginning of this decade precipitated the sharp decline in oil demand and lower energy/GDP ratios. Against this background of over-abundant energy supply and slower demand growth, the world was confronted with a downward trend in energy prices, particularly for oil.

Events in the past one year or so, in particular, have demonstrated that no amount of scenario planning efforts can help predict the business environment, and in particular, energy prices. Changes in the energy field are, in future, likely to be much less predictable than they were in the past.

There is no doubt that 1986 was, for the oil industry, an extremely difficult year. The near collapse of oil prices while having brought benefits to consumers, has encouraged a complacent and even a wasteful attitude towards energy supplies. The effect of this, if sustained over any significant time, cannot possibly be judged beneficial from anyone's point of view. On the contrary, it may prove to be extremely unfortunate in the longer term.

It must be remembered that the security of energy supplies for future generations will remain a constant function of our upstream efforts today.

The oil industry's capital expenditure on exploration and development has already been reduced by some 30% world wide. Considering the long lead time involved between exploration and the replenishment of supplies, the absence of major new discoveries and the general consensus that oil will become more scarce and even more expensive in the 1990s and thereafter, this phenomenon is bound to have serious negative implications. What is of more concern, cheap oil is already threatening the development and viability of renewable energy sources.

B. MALAYSIA : ENERGY PLANNING AND DEVELOPMENT

Energy planning in Malaysia adheres closely to the security of supply objective. The most worrying aspect of Malaysia's energy balance, is the envisaged decline in crude oil production in the 1990s which, if not matched with current replenishmnent of petroleum reserves, could lead the country in the next decade to reverse its current status as net exporter of crude oil.

Fortunately, Malaysia is endowed with a significant energy resource base, which is still largely untapped. Recognising this fact, the Government's energy development activities revolves around the FOUR-FUEL ENERGY POLICY.

The four-fuel policy addresses mainly the supply side and is aimed at introducing diversification in energy options to the country in the form of natural gas, hydropower and coal, besides oil, which has been the major energy source for the past few decades. The four-fuel policy was introduced with the stated objective of attaining a satisfactory diversification fuel mix by the turn of the century.

The rationale underlying this strategy is logical when considered in the light of Malaysia's abundant indigenous natural gas reserves of about 52 trillion cu. ft. and the vast hydropower potential of 29,000 MW.

Natural gas reserves in oil equivalent terms amounts to 9.5 billion barrels which is 3 times larger than our oil reserves of about 3 billion barrels. The R/P (reserves-to-production) ratio of our gas reserves is likely to allow for a lifespan of about 100 years based on the planned production rate rising from the current 1440 mil.SCF per day to about 2500 mil.SCF per day by the year 2000. This compares favourably with the R/P ratio of our oil reserves of about 17 years.

Malaysia is also richly endowed with hydro potential. Studies commissioned by the government have estimated that the hydro potential in the country amounts to about 29,000 MW or 550,000 BDOE.

Currently, there are a total of nine hydropower stations operating in the country with a total generating capacity of 1,346 MW. Long term plans to harness the hydro potential will foresee additional new hydropower projects with a total power generating capacity of over 4,000 MW.

These projects will include small hydropower projects in Peninsular Malaysia and possibly huge hydro projects in Sarawak. However, in view of the tremendous investments required, the technical feasibility and the availability of a more practical alternative, which is natural gas, these hydro projects are likely to come onstream only in the longer term.

Coal is included in the four-fuel strategy as an alternative energy source primarily because proven coal reserves worldwide are enormous and could meet a portion of present energy requirements.

Like most other developing countries, Malaysia's economy is expanding and simultaneously shifting from a predominantly agricultural to a more agro-industrial base. This transition from traditional low energy-using activities in the early 1970s to the modern, high productive technologies today, required large inputs of energy. As a result there was a rapid increase in energy consumption in the '70s at an average rate of 7.5% per annum.

Energy consumption in the '80s and in the next decade is expected to increase at a reduced annual rate of 6.2% and 4.4% respectively owing primarily to greater efficiency in utilisation.

In terms of sectoral energy consumption, the transportation sector was the largest energy consumer in the '70s accounting for about 35% of the total energy consumed in the country while the industrial sector accounted for around 27%.

With rapid industrial development taking place in Malaysia in the present decade, the consumption pattern has been reversed with the industrial sector currently accounting for about 40% of the total energy consumption in the country. Present energy planning in Malaysia recognises the fact that the industrial and transportation sectors will continue to see higher energy consumption rates, compared with the power and household sectors, owing to the Government's development objectives.

C. NATURAL GAS DEVELOPMENT: PENINSULAR GAS UTILISATION (PGU) PROJECT

Central to Malaysia's future energy development will be the utilisation of indigenous natural gas resources to meet the increasing demand for energy. Currently, natural gas consumption is confined to the power and industrial sectors which utilise gas at the rate of 61,000 BDOE.

Gas consumption is envisaged to grow at a rate of 9.4% per annum from now till the year 2000 and natural gas is expected to contribute significantly to the energy supply mix to account for 40% of total energy consumption by then. Every effort is being made to ensure that this will become a reality in the future.

Recognising the significance of the value of natural gas as a form of fuel and feedstock, and in support of the government's move to diversify its energy resource-base, the Peninsular Gas Utilisation (PGU) project was launched by PETRONAS in 1982. The primary goal of this project is to reduce significantly the use of oil in the power sector and to deliver natural gas to end-users in the domestic market. Any residual gas volume may be exported to generate export earnings.

The PGU project is the largest energy project presently underway in the country. The PGU project will be implemented in three stages. Stage I of this project was completed in March 1985 and gas was delivered to a combined-cycle power plant, a steel mill and a few hundred households, all of which are located near the land terminal in the state of Terengganu. The Stage I project comprises construction and installation of offshore gas production and gathering facilities as well as onshore gas processing and distribution system.

Stage I has a capacity to process and deliver 250 million SCF per day of natural gas which is harnessed from the oil and gas fields located offshore Terengganu.

In addition to a gas processing plant and delivery pipelines, facilities for the storage and export of Liquified Petroleum Gas or LPG were also constructed to take advantage of the LPG rich gas from the offshore fields.

The Stage II project is now underway with the Project Management Consultancy contract having been awarded to the Canadian company, NOVACORP which is involved in a joint-venture with a Malaysian Company. We hope to complete this phase by the end of 1990. Stage II will consist of two systems: System I which involves the installation of high pressure pipelines and ancillary facilities such as metering stations, compressor stations and a SCADA system. System II involves the construction of the second gas processing plant and additional refrigeration facilities for the storage of LPG at the Export Terminal.

As part of System I, a 725 kilometre cross-country pipeline will be laid, thus establishing the base for the future gas grid of the country. This pipeline will be capable of delivering 500 million SCF per day of natural gas. The main target is to deliver natural gas to power stations so as to enable the power generation sector to switchover to gas.

At the same time, natural gas will be delivered as fuel to heavy industries in the country and as feedstock to launch and support the domestic petrochemical industry, besides supplying gas to other end-users in the transportation, commercial and household sectors.

D. ROLE OF NATURAL GAS IN TRANSPORTATION

As the transportation sector is currently almost 100% dependent on oil there is tremendous scope for substitution by gas fuels.

LPG as autofuel made its debut in the country in 1982 and it is now being marketed by PETRONAS and the larger oil companies in various parts of the country. LPG consumption in transportation is, at around 30 b/d compared to over 47,000 b/d of motor gasoline, still experimental with a marginal impact. The number of vehicles that have been converted to run on LPG fuel total about 1,000 vehicles or 1% of the total vehicle population.

Besides LPG, we are planning to introduce Compressed Natural Gas or CNG for the transportation sector. Currently, a pilot project on CNG is being undertaken by PETRONAS' subsidiary, PETRONAS GAS SDN. BHD., which is also entrusted with the implementation of the PGU project. Plans to expand the number of CNG stations, besides the current single station, are presently underway.

About 30 vehicles have been converted to run on CNG under the CNG pilot programme. The target is to convert at least 2,600 vehicles by 1990.

E. DOMESTIC SECTOR GAS RETICULATION

The household sector offers yet another important potential market for natural gas. Today, gas utilisation in Malaysian homes is in the form of LPG, which is mainly distributed through cylinders. Only in certain parts of the country is this gas being distributed through reticulated pipelines. Reticulated LPG schemes are a temporary measure currently geared towards seeding the market for the introduction of the later natural gas reticulation with the completion of Stage II of the PGU project.

F. PETROCHEMICALS : LAUNCHING A NEW INDUSTRY

Natural gas provides an excellent resource base for the petrochemical industry. Although the current worldwide glut of petrochemicals is a major setback to the establishment of the petrochemical industry, we have however, continued to explore long range plans for the future development of this industry.

Various petrochemical projects have been considered and topping our priority list is the Methyl Tertiary Butyl Ether (MTBE) plant geared for the production of an octane booster to replace lead in gasoline. This is in keeping with the government's efforts to curb environmental pollution.

The MTBE plant is designed to produce 300,000 mtpy of MTBE, utilising locally-produced feedstock such as propane and butane from the gas processing plant and methanol.

Other projects under consideration include a polypropylene plant, an ethylene/polyethylene plant, a caprolactam plant and a Middle Distillates Synthesis plant.

In the next few years, we are likely to invest over US$1.5 billion in the petrochemical industry. As our policy is to implement petrochemical projects on a joint-venture basis, foreign investment and participation in this sector will certainly be welcome. Foreign companies can also take advantage of the investment incentives provided by the Malaysian government.

G. CONCLUSION

Although several energy-based projects, with energy as feedstock, have been embarked upon in Malaysia, the Government and PETRONAS remain mindful of the need for efficiency in utilisation. While Malaysia is currently self-sufficient in energy and exporting crude oil and LNG, energy policies in the country continue to reflect the importance of the security of supply factor.

As a matter of strategy, energy planning has been incorporated into the overall economic and industrial development planning process. In support of this process, several energy and energy-based studies have been commissioned by the Government. These include the National Energy Planning Study, the Master Plan Study for Gas Utilisation and the Gas Pricing Study.

Energy development activities in Malaysia are not confined solely to primary energy resources. Efforts are being made to tap energy from renewable sources such as biomass and solar energy.

Within this context, the Palm Oil Research Institute of Malaysia has undertaken studies on both the biogas and the palm diesel projects. The biogas project is aimed at using palm oil waste for electricity generation in the rural areas while the palm diesel project will utilise palm oil for the production of diesel for use in diesel engines. If the palm diesel project is commercially successful, it would not only provide another source of energy to Malaysia, but would give added value to the country's palm oil production.

In conclusion, I would like to state that energy development in Malaysia has proceeded along a path, which has mostly erred on the side of caution. Energy planning in Malaysia continues to be guided by the delicate balancing of the twin objectives of security of supply and the need to meet the economy's development targets. In this regard, replenishment of existing energy reserves, the development of renewable energy resources and the study of relevant technology in non-conventional energy projects remain means for Malaysia to stretch her energy self-sufficiency in the future.

With this I conclude my presentation and would be pleased to answer any questions. Thank you.

PETRONAS
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GAS MARKET DEVELOPMENTS IN WESTERN EUROPE

Presented by
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A. Introduction

The production and use of natural gas in Western Europe has evolved in a time frame and under a set of constraints which makes the present position and the prospects very different from the much more familiar - and the much more closely analysed - situation of natural gas in North America. As I have not been invited to this conference to contribute a comparative study I do not plan to make a specified and detailed analysis of the differences, but much of what I have to say will reveal the existence of contrasting conditions and, I hope, put you on your guard against making an interpretation of the Western European gas market situation and prospects in the context of your familiarity with the industry here in North America.

There are problems even in respect of terminology. Measurements of gas volume in Western Europe are made and presented in terms of milliards of cubic metres (under defined temperature - 15°C - and pressure - 1.01325 bar - conditions) and such terms will be employed in this paper. I assume that cubic metres will not cause any problems in a metric system orientated Canada, but note that a milliard is 10^9 - the same as a North American billion ; and that a billion in Europe is 10^{12} which here, I believe, is defined as a trillion. This gives plenty of scope for a thousand-fold confusion over quantity ; in which context the 35.3 multiple to convert m^3 into cu. ft. pales into relative insignificance! Meanwhile, perhaps we can hopefully avoid becoming entangled with the further pitfalls arising from conversion difficulties between kilocalories (the usual measure of heat value in Europe, unless the joule is used instead) and BTUs : but if it should be necessary and was helpful, bear in mind that 1 kilocalorie equals approximately 3.97 BTUs!

B. Western Europe's Natural Gas Developments to date : the Key Parameters

First, the industry on anything other than a local scale (as in S.W. France, North Germany and the Po Valley of Italy) is recent.[1] The first major discovery, now known as the Groningen on-shore field in the northern part of the Netherlands and currently estimated as having had almost 2500 milliard m^3 of initially recoverable reserves (= about 88 Tcf), was not made until 1959 and it did not begin to produce commercially until 1965. The important British south North Sea gas fields date from the middle to late-1960, and the Norwegian gasfields now in production from the early to mid-1970s. The super-giant Norwegian offshore Troll field (with a currently estimated c. 1500 milliard m^3 of recoverable reserves) was discovered in 1980 and is not scheduled to begin production until 1993. See Map 1 for the geography of discoveries/potential supply in Western Europe.

Second, because the major discoveries and production are recent and the history of natural gas use is short (see Table 1), and because the potentially gas-rich areas are very extensive (especially offshore around much of the long coastline of Western Europe as shown in Map 2), the natural gas industry in Western Europe is still in its youth - if not its childhood. Even the Groningen field is little more than 40% depleted (on currently declared reserves figures) after 23 years of production at annual rates which reached more than 90 milliard m^3 (equal to c.9000 million cubic feet daily). The annual production potential of gas in Western Europe is no where near its peak - or plateau - level, and there are decades of exploration yet to come. Any alternative views you may have previously read are 99% likely to be wrong.

Third, the economic geography of Western Europe, with its short distances between points of gas production and areas of use (as seen in Map 3) coupled with the spatial intensity of energy demand in the industrial, commercial and residential sectors, provides a highly attractive environment in which gas can compete against other energy sources. Furthermore, the increasingly effective high-profile lobby against atmospheric and water pollution gives the gas industry an advantage over oil and coal, while the anti-nuclear power lobby is embracing increased natural gas use as the most effective alternative to the expansion of nuclear generated electricity.

Fourth, the transmission and marketing of natural gas over much of Western Europe has been entrusted to state owned, or state controlled, entities which generally emerged from the 19th century town-gas industry orientated to limited and local markets. By the 1960s the industry was already in severe economic difficulties as a result of the rapidly rising real cost of suitable coal for gas making, and competition from oil and electricity for traditional markets. The mid-1960's large scale availability of natural gas rescued the industry from an early demise, but it kept it in the hands of managements which generally had limited horizons - both geographically and in range-of-markets terms. There thus emerged a perception of gas as an energy source with limited market prospects : a perception which was soon intensified by the newly and quickly acquired idea that gas was a "premium" fuel which must not be sold other than in the highest value market outlets.

Fifth, this limited and high-value view of gas markets has, moreover, been accompanied by an even more widely held perception that natural gas is in inherently very limited supply so that the future physical availability of supplies must be in doubt. Thus, it was generally assumed in Western Europe in the 1970s that early exploration for gas had not only given an instantaneous 100% accurate figure of the sizes of discovered fields, but had also indicated, with a high degree of probability, the totality of the continent's gas resource base. It was argued - and largely accepted by policy makers at national and international levels - that the rational and orderly planning of markets necessitated no commitments being accepted for marketing any gas other than those for which reserves had already been proven. The concept of "undiscovered but discoverable gas" (on the basis of which natural gas' use has been expanded elsewhere in the world) was ignored or rejected as a relevant input to future gas market developments in Western Europe. The prime objective - and concern - of gas policy makers and planners was a perceived "need" to close the so-called future "supply gap" : that is, the post-20 to 25 year time in the future when a gap appeared between an extrapolated future level of demand (with an assumption of slowly rising use in the markets designated for gas) and the availability of contracted supplies from proven reserves. In other words a self-justifying limitation was imposed on the development of gas markets in Western Europe in the context of institutional/organisational arrangements which served to encourage such constraints; in a system which, as I shall show later, virtually eliminated competitive behaviour.

Sixth, governments allowed - nay, required - gas prices to be set higher than the prices of alternative energies in different end uses. Thus, gas prices for steam-raising were set higher than fuel oil or indigenous coal prices (and hence well above lower imported coal prices) while for commercial and residential markets gas prices were fixed above gas oil prices and, in some countries, even above the price of electricity where this was sold for space and water heating and for cooking. Additionally, as if to make sure that natural gas was prevented from competing in markets in which there were so-called national interests and policies to protect (notably in respect of the required maintenance of indigenous coal production and to ensure success for the usual preferential policy towards nuclear power expansion), many national governments - and later the European Commission - "prohibited" the use of natural gas for power generation - not only in relatively thermally inefficient condensing stations, but also in much more efficient combined cycle and combined heat and power modes.

C. The Development of Natural Gas Markets by the mid-1980s

The expansion of the gas market in Western Europe from about 10% in 1971 to just over 15% in 1986 is, nevertheless, usually presented as a success story - thanks to the active public relations departments of the companies concerned. In reality it is no such thing : the increase merely represents a modest achievement by consumers in securing a little more of their generally preferred source of energy against a combination of restraining commercial and political interests on both the supply and the demand sides.

Given, first, a plethora of indigenous gas resources (see Table 2) and a large import potential for additional gas supplies from a number of external sources (see Map 1) ; and second, all the uncertainties over supply and price which have beset the international oil market since 1972 (when Western Europe depended on external oil for over two-thirds of its total energy needs) ; and third, the clear inability of either the indigenous coal or the nuclear industry in Western Europe to expand their contributions to total energy supply to anything like the degree written into the policy makers and planners' expectations, the mere five-point increase in gas' percentage share of the energy market over the past decade and a half indicates a failure. It is clear evidence of the effectiveness of anti-gas expansion policies and strategies based on misconceived notions of the scale of the indigenous resource base, of the opportunities offered by the potential availability of relatively low-cost imports, and of the nature of the complex set of markets for natural gas.

Thus in the Western Europe gas market today there is the double irony of an under-exploited supply potential and an under-developed market. The misconceptions over gas supply and gas markets are, moreover, not simply allowed to persist by the powerful club of gas transmission and distribution companies/institutions (some state and some private). They are deliberately encouraged by them. In their largely unconstrained exercise of power in the gas markets these entities continue to persist with inflexible long-term (20 to 25 year) strategies of limited throughputs to high value markets. Their managements' principal objective appears to be to secure guaranteed long-term supplies just adequate to meet their pre-determined choices of markets from which they expect little by way of competition from alternative energy sources. The whole set up reflects a "satisficing" approach by management anxious to be seen to be doing a technically excellent job, but with no stomach to accept the challenges and to respond to the opportunities of a competitive approach to Western Europe's energy markets. Thus, on the one hand, there is the prime commitment to the paper-contracts which seek to "avoid" the long-term so-called "supply gaps" and the associated concern for what are probably over-engineered (and over-priced) transmission and storage systems (see Map 4). And, on the other hand, there is inadequate attention to research which seeks - as its prime motivation - to expand market opportunities for gas. It is, for example, not surprising in this context that it is the Dutch electricity industry's research facilities that are at work on improving the thermal efficiency of gas-fuelled combined cycle power plants; or that little is heard in Western Europe of gas-industry research and development on gas-fuelled motor vehicles or gas refrigeration or gas-driven heat pumps for small-scale applications. The European electricity industry, on the other hand, devotes major R. and D. efforts to markets' development possibilities - given its competitive and expansionist attitude to its product in the continent's energy economy.

In the light of such forecasts it is hardly surprising that inter-governmental organisations in Western Europe - notably the E.E.C. and the I.E.A. - have, until recently, predicated[2] a declining supply of indigenous gas and slowly rising volumes of imports to meet the limited degree of market penetration that gas is supposed - or allowed - to achieve. Whilst it would be unfair to describe the managers of West Europe's gas industry and the region's energy/gas policy makers as having had a collective death wish, it would be even more unjustified to conclude that they are now desperately anxious to take appropriate steps to see that the industry grows up. The present state of the gas industry in Western Europe can, as a result, perhaps best be described as one of "premature middle age" - if not one of "early senility"!

D. An Alternative Prospect?

Recent developments and the present situation indicate that there is a great deal of inertia in the European gas market, partly because this suits the main actors in the system (viz. the club of large transmission/distributing companies, together with many of the largest suppliers, including NAM in the Netherlands, Statoil and British Gas) ; and partly because there is no effectively organised pressure group whose aim is to achieve fundamental change. Even consumer watchdog bodies are convinced that gas is such a scarce commodity that their central concern must be for the very long-term availability of supply - and hence they are opposed to gas' expansion into so-called non-traditional and non-premium end uses. Moreover, most European countries' governments have favourite uneconomic energy investments to protect - such as high cost coal production and use in Britain and West Germany, and heavily capital intensive nuclear electricity in France and Belgium. There are thus a plethora of forces which, for one reason or another, would be unhappy with an upheaval in the orderly markets which they have helped to make ; and many of them would still not be against taking action to eliminate the possibility of such an upheaval. No significant political grouping is positively and unequivocably for a major expansion of gas production and/or use. Even the environmental lobby - which recognises the utility of increased gas use as a pollution-reducing strategy - is inhibited in its support for gas by its equally fundamentalist conviction that gas, as a fossil fuel, is inherently scarce. The Swedish experiment, in drilling deep into non-sedimentary rocks, to find some of Professor Gold's deep abiogenic gas[3] is still neither well enough known, nor far enough along to have had any effect on such negative attitudes.

There is, nevertheless, an element of increasing rivalry - not yet strong enough to be converted into a willingness to act competitively- between the gas suppliers within Western Europe. This is a result of the now grossly excessive availability of gas relative to demand at current price levels. Indeed, if Northern America can be described as having a "gas bubble" of supply potential, then Western Europe has a proverbial "barrage balloon" of the same phenomenon. Except for the U.K., whose gas system has no connections with the rest of Europe, gas producers elsewhere have all suffered (and are still suffering) from lower than expected sales with resultant less than fully used capacity in both production and transport facilities. Restrained demand, coupled with the increasing availability of gas from new - including outside - suppliers, has become the essential determinant of levels of production : instead of production limitations determining the size of the industry as had been predicated by national and inter-governmental policy makers as well as by some of the producing companies themselves.[4]

In some countries gas from other European suppliers was contracted (sometimes on a take or pay basis) in the expectation of scarcity and this imported gas now has to be used preferentially over indigenous gas. For example, gas bought from Norway under the original contract for Ekofisk area gas has backed out the use of indigenous German and Dutch gas ; and in Italy and France imports both from other European countries as well as production from national fields have been substituted by imports from elsewhere. And discovered UK gas has remained unexploited because the B.G.C. preferred- and, indeed, still prefers - to buy supplies from Norway.

Exporters of gas to Western Europe were, for a period, attracted like wasps to the proverbial open pot of honey - not only as a result of the expected "supply gaps" to which European gas policy makers so frequently referred, but also because of the very high prices which the West European gas distributors were prepared to pay, safe in the knowledge that the gas could be sold on to captive customers at above oil equivalent prices and in their confident - though mistaken - expectations that oil prices would go on going up - even from the dizzy heights of the early 1980s. By today, however, as a consequence of the constrained market objectives of the West European gas industry, exporters have discovered not only that they have built gas export capacity they cannot fully employ (for example, the Soviet and Algerian gas export lines, and the Nigerian and Algerian L.N.G. facilities), but also that they have been obliged to agree to renegotiate contracts in respect of both volume and price. Such treatment may not be entirely unrecognisable by Canadian gas exporters in terms of their own experiences in the U.S. in recent years!

Thus, for the while, the gas exporters and potential exporters (such as Qatar) to the Western European market have been forced to reduce their expectations : particularly in the aftermath of the closed deal that has been made for the first stage development of Norwegian Sleipner and Troll reserves and their transport to mainland European markets (See Map 5) between Norway (through Statoil), the other entity mainly concerned with production (viz. Shell), and the Club of European gas purchasing entities (led by Ruhrgas). This deal has been generally presented as "a major breakthrough" for gas in Europe - because of the volumes of reserves involved (at least 1500 milliard m^3), the new technology required for the production system, and the "need" to have guaranteed large scale and long term contracts for the gas - before the work can start. In a technical and a political sense it is a breakthrough. In the technical context it ensures the exploitation of large reserves from a more difficult environment than any other previously tackled in the North Sea ; and in political terms it not only drags Norway in a more positive and long-lived relationship with the rest of Europe, but it also shows the European-wide nature of Shell as a key actor in the political process, with its interests in both the production and the transmission/distribution functions. In economic terms, however, the Sleipner/Troll deal can be viewed as the means whereby the status quo in the European gas market is to be maintained. Indeed, given the exclusive involvement of all of the parties with a vested interest in a basic "no-change" situation (in terms, that is, of allocating relatively high price gas to a limited range of customers with high value end-uses), it is not at all surprising that this "new" Norwegian gas is presented essentially as a development which will fill the "supply gap" from the mid-1990s onwards- with the interested parties' supply-side hypothesis related to their expectation of a need to replace Groningen gas and their demand side forecasts hypothesising only a very slowly expanding gas market. In other words the interest in the Sleipner/Troll deal - and the shape and form which it has been given - indicate that the development is related essentially to the maintenance of the strait-jacket within the confines of which the European gas industry has been moulded and curtailed for almost 30 years. In the light of this major extension of the existing gas market structure the prospect for an alternative future for the gas market in Western Europe this side of the year 2000 has been greatly reduced - in the continued absence of any E.E.C. will to impose a more competitive structure on the industry and in spite of the much higher potential production possibilities from Western Europe's own resources (as shown in Table 2).

E. The remaining Shorter-Term (pre-mid 1990s) Alternative

The one remaining alternative hope for the European gas market breaking out of its contemporary strait-jacket depends on a high-level, high-stakes geo-political play involving much more than natural gas per se. This prospect relates to the recent momentous changes in Soviet domestic and external policies. The combination of a potential agreement for major reductions in arms and in tension between the Soviet Union and the West, and of new economic policies in the U.S.S.R. itself, orientated to the enhanced production of goods and services to meet the wishes of the population, opens up the possibility for a more rapid exploitation of the country's vast natural gas resources and a massively increased flow of Soviet gas exports to Western Europe. Indeed without his increased production and export of gas the plans of Gorbachev have a much higher probability of being unrealisable.

Elsewhere[5] I have discussed the range of issues involved for the Soviet Union in this potential for gas - and the economic and political objectives which could be derived from it. In this paper it is more appropriate to concentrate on the gas component per se and on the implications of greatly enhanced Soviet gas imports in the West European gas market from the early 1990s on.

First, there is no supply side reason why the current c. 35 milliard cubic metres of Soviet gas exports to Western Europe should not - in the fullness of time - be increased threefold or fourfold, or even more. And the 'fullness of time' is itself variable, with a high probability that it could well be shorter rather than longer, given significant near-future détente between east and west.

Second, in the aftermath of the Troll deal whereby the limited market horizons of Western Europe's gas industry and its policy makers have been satisfied for the next generation, such additional Soviet gas exports will have to be made available at a price which enables gas markets to be significantly expanded - notably into the so far little exploited large scale steam-raising and power generation sectors. This implies Soviet gas availability at a price which is related to (though not as low as, in thermal equivalent terms) the price of the lowest-cost alternative, viz. imported coal, currently available at about 50% of the fuel oil equivalent price, to which most gas traded in Western Europe has hitherto been price related.

Third, in that the Soviet Union will - for its own economic reasons

- insist that any enhanced flow of its gas to Western Europe is based on counter-trade arrangements and so, in effect, offer guaranteed markets in the Soviet Union for a much expanded volume and range of European goods and services (in an international situation of increasing difficulties elsewhere in the world for Europe's relatively high-cost exports), there will be many interest groups in Western Europe - ranging from political parties, through organised labour and to the supplying industries themselves - which would welcome such an opportunity for additional exports. Their combined influence could easily exceed that of the gas - and other energy - industries which can be expected to oppose the Soviet offer of much more gas on the grounds that it will be a market-destabilising force : especially since more Soviet gas would bring lower energy prices all-round for Western European consumers.

With such a breakthrough in the Western European gas supply situation, engendered by a new Soviet policy on gas which, because it emerges as an essential element in Soviet economic restructuring and expansion, is likely to be a long-term phenomenon, then other gas suppliers - both external (such as Algeria) and internal (notably Norway, but not necessarily excluding the Netherlands and the U.K., the two other European countries with large gas reserves as shown in Table 2) - would be obliged to compete. The result could be the end - or at very least a severe and significant modification - to the present regime of inertia and regulation in the European gas market.

Given these developments, then natural gas' current approximately 15% share of the total Western European energy market would become but an interim staging post en route to a much higher achievable percentage contribution - of up to 30% in the final analysis. Gas could then continue to replace oil products and it would begin to offer more effective competition to electricity, not only in end use markets hitherto more or less exclusively available to the latter, but also as it becomes an increasingly important input to power generation. In this market gas fuelled combined cycle electricity production would become a generally preferred option over coal and nuclear fuelled conventional, less efficient condensing power stations while gas fuelled combined heat and power (CHP) projects were enabled to develop as a much more important part of the energy systems in both industry and commerce.

As indicated earlier in this paper, Western Europe has an energy market structure which is inherently much more favourable to high levels of gas use than in either the United States (and Canada) or the Soviet Union

(See Map 3). This is the result of the much higher geographical intensity of energy demand in a much smaller and more densely populated part of the world, with the advantages these features give to natural gas use because of lower unit costs of transmission and distribution. Inertia and regulation in the industry and at policy making levels have hitherto inhibited - and, indeed, continue to inhibit - the expansion of gas use to its "rightful" share of the Western European energy market.

A change in the fundamentals of the gas market in Western Europe, sparked by the potential availability of much increased volumes of lower cost gas in the context of progress towards east-west détente, now seems to be the only serious possibility for overthrowing the propensity of the gas suppliers, distributors and governments in Western Europe to take high economic rents by making cheap gas available to customers at high prices. The potential benefits which are achievable from a major expansion of the gas market could then become generally recognised as much too significant to be ignored - and to be denied to Western European energy consumers specifically, and to the population at large more generally - by the restrictive practices of existing gas market institutions and by inappropriate policies.

Under such an alternative prospect for future gas markets in Western Europe, the continent would, of course, become a relatively much more important gas using region by the early years of the 21st century. By then, a more than doubled gas use and a near doubled share of gas (compared with conventional expectations for 2000) in the total energy supply (in a relatively slowly growing energy market), will make the role of gas in the Western European system markedly different from its present position - and from the prospects as conventionally presented. Gas could, indeed, become the single most important component in the total required supply of energy. It could thus serve to ensure that Western Europe not only has energy costs no higher than other industrialised regions of the world, but also has an energy supply system with inherently greater thermal efficiency conversion prospects. The use of coal and oil would be significantly reduced so that the energy system overall would be relatively much more environmentally-friendly. The potential growth in consumer-located ('on-site'), gas fuelled combined heat and power generating capacity, together with the substitution of gas for electricity in a number of end-uses for which electricity has hitherto been dominant (and which were, moreover, expected to provide significant growth markets for electricity) will slow down - and eventually even reverse - the trend towards the so-called "electrification of society". This change will undermine the sole remaining argument for the further expansion of nuclear power, and so provide the chance for Europe to move towards a no-nuclear system, thus meeting the preferred energy sector option of most of the population of Western Europe - in the aftermath of Chernobyl.

Rotterdam

August 1987

NOTES

1. My 1969 study, Natural Gas in Western Europe : a Case Study in the Economic Geography of Resources, (De Erven F.Bohn, Haarlem 1969) was an early analysis of the then initially emerging gas market prospects.

2. See, for example, successive issues until 1985 of the I.E.A.'s Annual Review of Energy Policies and Programmes of I.E.A. Countries (O.E.C.D. Paris) and the E.E.C.'s Review of Member States' Energy Policies, Brussels 1984. Most recently both organisations have been obliged, to change their views, in the light of the overwhelming evidence of a massive upside potential for increased indigenous gas production and unlimited (relative to forecast demand) potential for imports from elsewhere. The damage that these Organisations' earlier mistaken analyses and predictions did to the prospects for the gas industry in Western Europe was, however, so serious that their earlier views will continue to be an important restraint on expansion for a long time yet.

3. Thomas Gold, Power from the Earth : Deep Earth Gas - Energy for the Future, J.M.Dent and Sons Ltd., London, 1987.

4. See the I.E.A. and E.E.C. reviews previously footnoted (Note 1). The limited potential to produce they reported reflected the nature of the information being supplied by national governments and/or state owned/controlled gas industry companies. For example, the Dutch Gasunie persisted in the emphasis it gave to gas scarcity in its Annual Reports until the middle 1980's.

5. See P.R.Odell, 'Gorbachev's New Economic Strategy : the Role of Gas Exports to Western Europe', The World Today, Vol.43, No.7, July 1987 pp.123-5.

Table 1

NATURAL GAS USE IN WESTERN EUROPE 1961-1986 (in $m^3 \times 10^9$)

Country	1961	1966	1971	1976	1981	1986
Austria	1.2	1.9	3.3	4.5	4.3	5.0
Belgium/ Luxemburg	-	0.1	6.4	11.3	10.5	8.4
Denmark	-	-	-	-	-	1.2
Finland	-	-	-	0.9	0.7	1.1
France	4.4	5.9	12.2	20.9	27.0	25.7
Greece	-	-	-	-	-	0.1
Iceland	-	-	-	-	-	-
Ireland	-	-	-	-	1.0	1.5
Italy	6.5	9.0	13.8	24.2	25.1	31.0
Netherland	2.3	3.3	27.1	36.3	33.0	35.5
Norway	-	-	-	-	-	-
Portugal	-	-	-	-	-	-
Spain	-	-	0.5	1.6	2.3	2.6
Sweden	-	-	-	-	-	0.2
Switzerland	-	-	-	0.6	0.9	1.0
Turkey	-	-	-	-	-	0.3
United Kingdom	-	0.9	19.9	38.1	44.7	54.0
West Germany	1.6	4.0	22.8	39.9	45.5	44.2
Totals ($m^3 \times 10^9$)	16.0	25.4	105.8	178.3	196.9	211.8
Number of Countries (out of 18) using Natural Gas	5	7	8	10	11	15
Natural Gas as a Percentage of Total Western Europe Energy Use	1.8%	3.3%	9.7%	13.4%	14.7%	15.2%

Source: Derived from B.P.'s 1987 Annual Review of World Energy and earlier years' issues of B.P.'s Statistical Review of the World Oil Industry.

Table 2

A MID-1987 OVERVIEW OF NORTHWEST EUROPE'S NATURAL GAS PRODUCTION, RESERVES AND POTENTIAL

(all data except R\P ratios in $m^3 x 10^9$)

Country/ Region	Production in			Cumulative Production to 1986	End-1986 Remaining Proven/Probable Reserves (1)	Reserves/ Production Ratio	Expected Average Ann.Prod. 85-90 (2)	Likely Remaining Reserves by 1990 (3)	R/P Ratio in 1990	Potential Peak Annual Prod. by mid-1990s (4)
	1965	1975	1985							
Netherlands:										
Onshore	2	94	65	1268	1655	26 yrs	75	1450	24 yrs	95
Offshore	0	0	16	80	300			400		
W.Germany:										
Onshore	12	15	17	322	260	19 yrs	15	300	23 yrs	20
Offshore	0	0	0	0	25			50		
Denmark:										
Offshore	0	0	2	4	175	44 yrs	3	220	73 yrs	10
Norway:										
North Sea	0	0	28	235	at least 2500	over 100 yrs	35	at least 3000	minimum of 100 yrs	more than 100
North of 62	0	0	0	0	at least 500			at least 1000		
United Kingdom:										
South North Sea	0	37	28	501	1180	42 yrs	47	1100	46 yrs	60
Elsewhere on C.S.	0	0	15	65	725			1050		
Onshore	0	0	0.1	0.2	10			30		
Ireland:										
Offshore	0	0	2	11	55	28 yrs	2	75	37 yrs	4
TOTALS	14	147	173	c.2500	at least 7385	43 yrs	175	at least 8700	at least 50 yrs	at least 275 (5)

Notes: (1) Based on Governments' and Companies' declarations of reserves

(2) Based on announced expected production schedules by governments and companies

(3) After allowing for production 1987-89 and for new additions to reserves in the meantime

(4) Assuming no artificial restraints on production (eg. policy restrictions), but allowing for technical restraints.

(5) This figure is less than individual countries' total because of temporal differences in peak production from country to country.

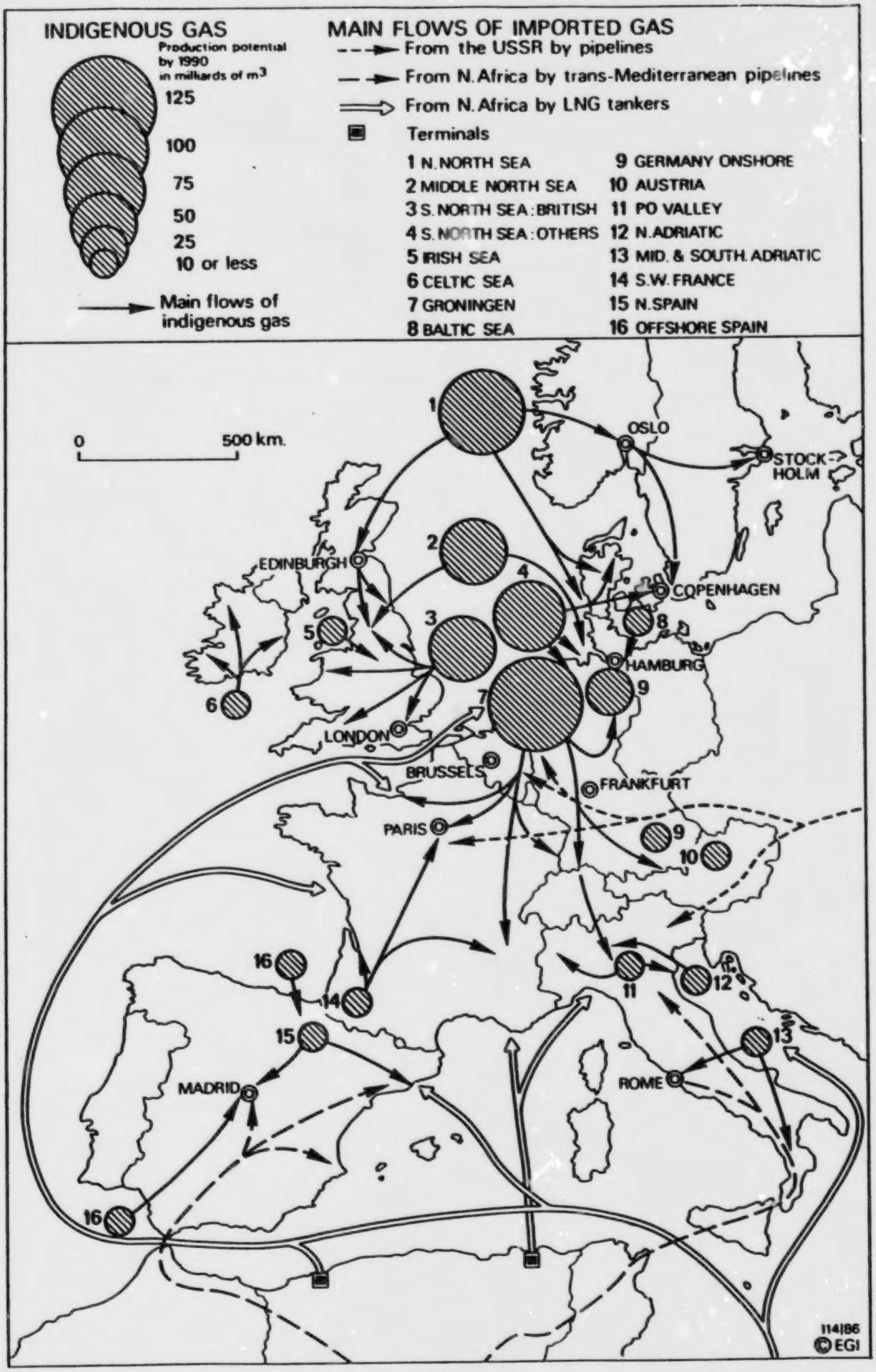
INDIGENOUS GAS
Production potential by 1990 in milliards of m3
125
100
75
50
25
10 or less
Main flows of indigenous gas
MAIN FLOWS OF IMPORTED GAS
From the USSR by pipelines
From N. Africa by trans-Mediterranean pipelines
From N. Africa by LNG tankers
Terminals
1 N. NORTH SEA
2 MIDDLE NORTH SEA
3 S. NORTH SEA: BRITISH
4 S. NORTH SEA: OTHERS
5 IRISH SEA
6 CELTIC SEA
7 GRONINGEN
8 BALTIC SEA
9 GERMANY ONSHORE
10 AUSTRIA
11 PO VALLEY
12 N. ADRIATIC
13 MID. & SOUTH. ADRIATIC
14 S.W. FRANCE
15 N. SPAIN
16 OFFSHORE SPAIN
0
500 km.
OSLO
STOCKHOLM
EDINBURGH
COPENHAGEN
HAMBURG
LONDON
BRUSSELS
FRANKFURT
PARIS
MADRID
ROME
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Fig.1 Western Europe's Gas Reserves and Production Potential

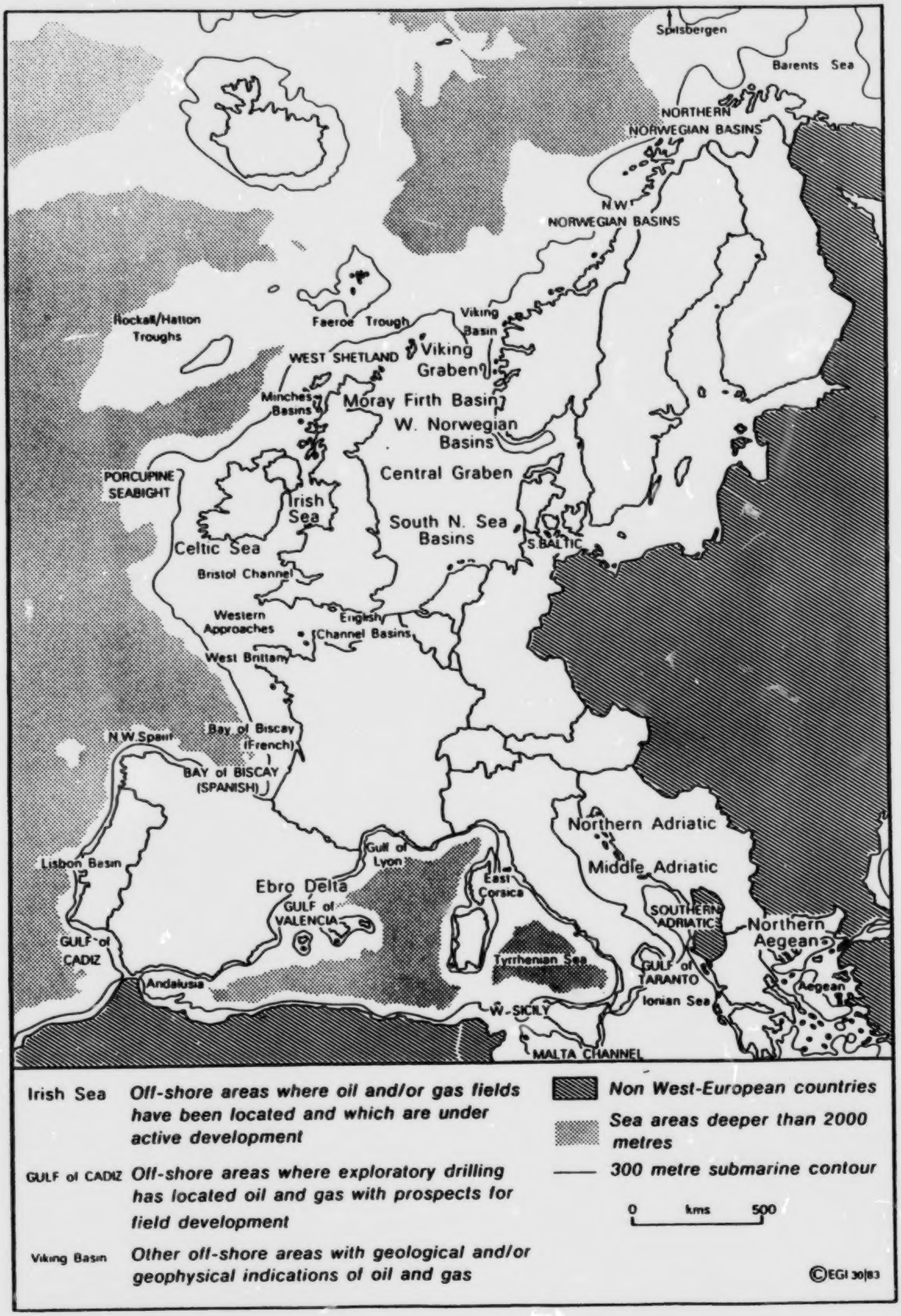

Spitsbergen
Barents Sea
NORTHERN NORWEGIAN BASINS
N.W. NORWEGIAN BASINS
Rockall/Hatton Troughs
Faeroe Trough
Viking Basin
WEST SHETLAND
Viking Graben
Minches Basins
Moray Firth Basin
W. Norwegian Basins
Central Graben
PORCUPINE SEABIGHT
Irish Sea
South N. Sea Basins
S.BALTIC
Celtic Sea
Bristol Channel
Western Approaches
English Channel Basins
West Brittany
N.W.Spain
Bay of Biscay (French)
BAY of BISCAY (SPANISH)
Gulf of Lyon
Northern Adriatic
Middle Adriatic
Lisbon Basin
Ebro Delta
East Corsica
GULF of VALENCIA
SOUTHERN ADRIATIC
Northern Aegean
GULF of CADIZ
Tyrrhenian Sea
GULF of TARANTO
Aegean
Andalusia
Ionian Sea
W. SICILY
MALTA CHANNEL
Irish Sea
Off-shore areas where oil and/or gas fields have been located and which are under active development
GULF of CADIZ
Off-shore areas where exploratory drilling has located oil and gas with prospects for field development
Viking Basin
Other off-shore areas with geological and/or geophysical indications of oil and gas
Non West-European countries
Sea areas deeper than 2000 metres
300 metre submarine contour
0
kms
500
©EGI 30/83

Fig.2 Western Europe's Petroliferous and Potentially Petroliferous Offshore Areas

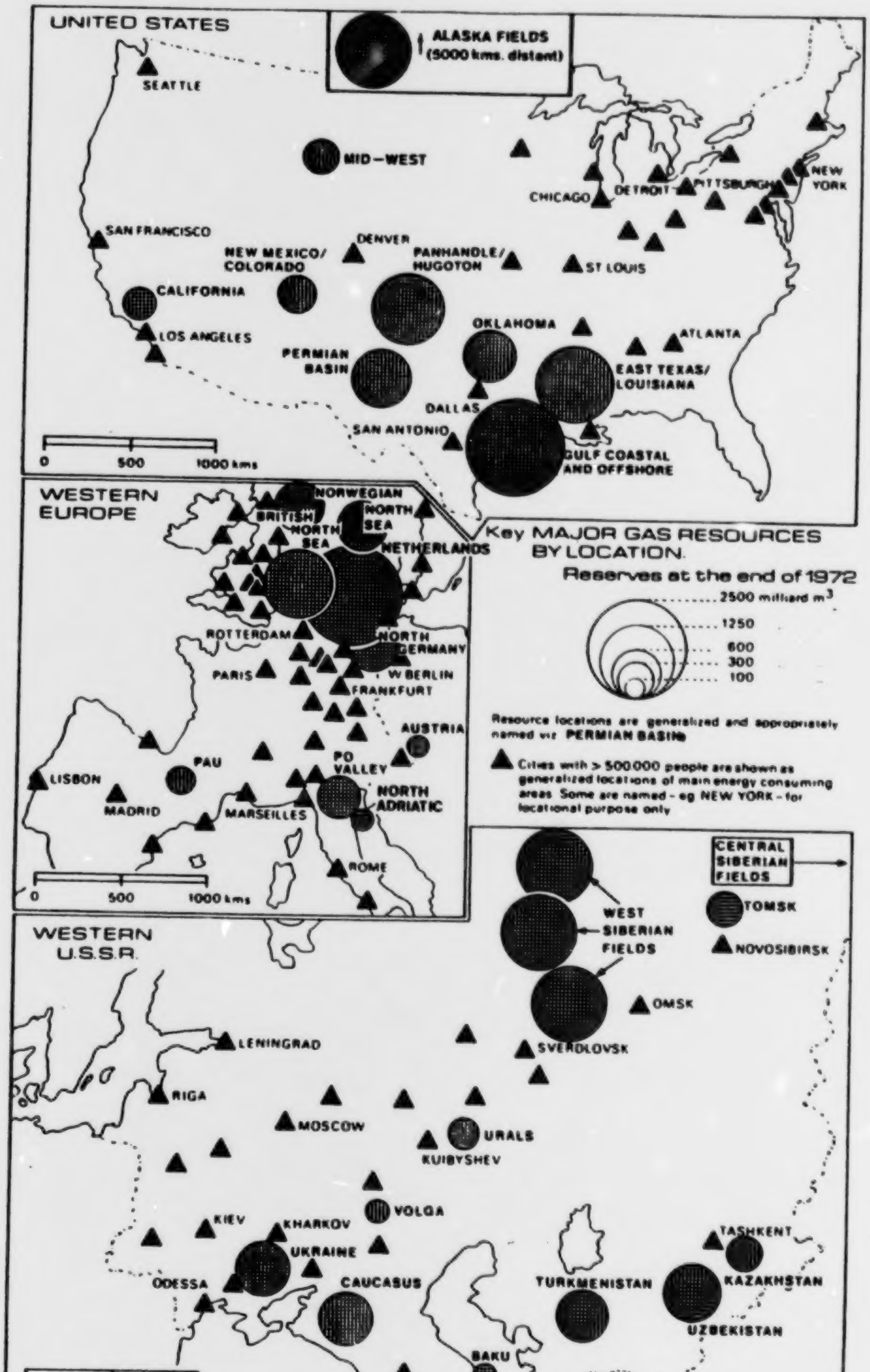

UNITED STATES
ALASKA FIELDS
(5000 kms. distant)
SEATTLE
MID-WEST
CHICAGO
DETROIT
PITTSBURGH
NEW YORK
SAN FRANCISCO
NEW MEXICO/
COLORADO
DENVER
PANHANDLE/
HUGOTON
ST LOUIS
CALIFORNIA
LOS ANGELES
OKLAHOMA
ATLANTA
PERMIAN
BASIN
EAST TEXAS/
LOUISIANA
DALLAS
SAN ANTONIO
GULF COASTAL
AND OFFSHORE
0
500
1000 kms
WESTERN
EUROPE
NORWEGIAN
NORTH
SEA
BRITISH
NORTH
SEA
NETHERLANDS
ROTTERDAM
NORTH
GERMANY
PARIS
W BERLIN
FRANKFURT
AUSTRIA
PAU
PO
VALLEY
NORTH
ADRIATIC
LISBON
MADRID
MARSEILLES
ROME
0
500
1000 kms
Key MAJOR GAS RESOURCES
BY LOCATION.
Reserves at the end of 1972
2500 milliard m³
1250
600
300
100
Resource locations are generalized and appropriately named viz PERMIAN BASIN
Cities with > 500 000 people are shown as generalized locations of main energy consuming areas Some are named - eg NEW YORK - for locational purpose only
CENTRAL
SIBERIAN
FIELDS
TOMSK
NOVOSIBIRSK
WEST
SIBERIAN
FIELDS
WESTERN
U.S.S.R.
OMSK
LENINGRAD
SVERDLOVSK
RIGA
MOSCOW
URALS
KUIBYSHEV
VOLGA
KIEV
KHARKOV
UKRAINE
TASHKENT
ODESSA
CAUCASUS
TURKMENISTAN
KAZAKHSTAN
UZBEKISTAN
BAKU
0
500
1000kms
©EGI

Fig.3 The Proximity of Gas Production and Energy Using Areas in Western Europe compared with the U.S.A. and the U.S.S.R.

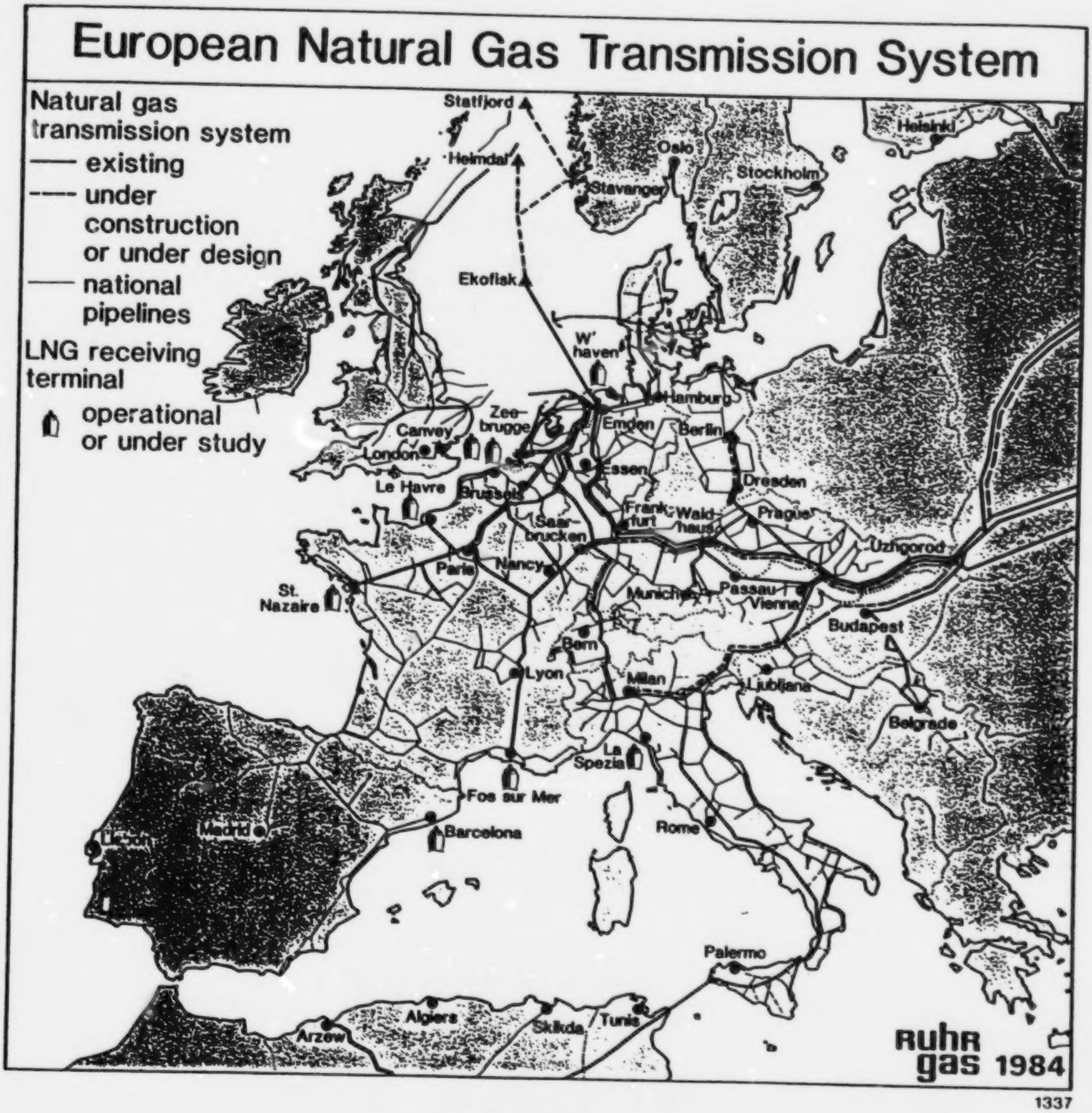
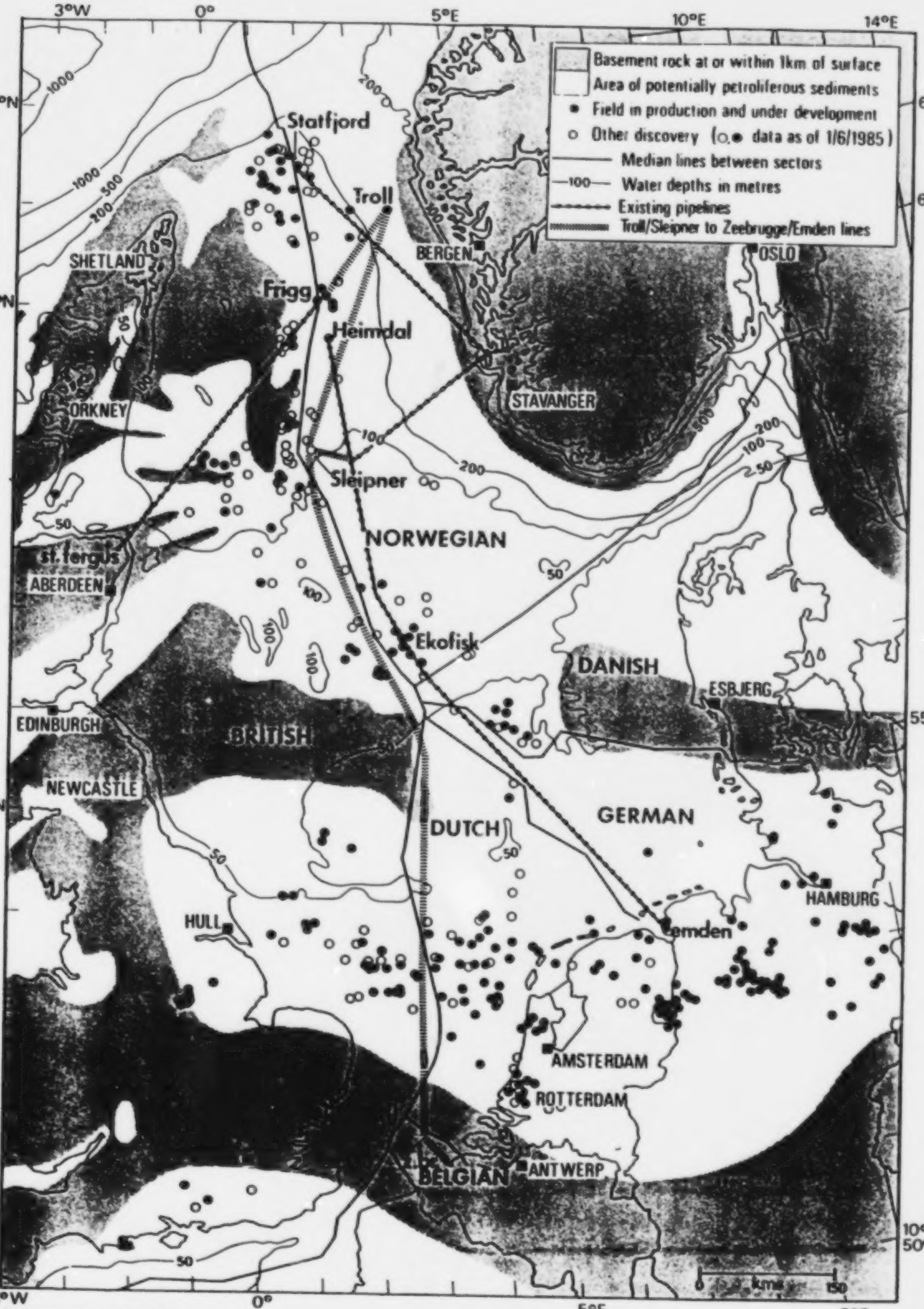

European Natural Gas Transmission System
Natural gas transmission system
existing
under construction or under design
national pipelines
LNG receiving terminal
operational or under study
Statfjord
Heimdal
Ekofisk
Oslo
Stavanger
Stockholm
Helsinki
W' haven
Hamburg
Emden
Berlin
Essen
Dresden
Canvey
Zee-brugge
London
Le Havre
Brussels
Frank-furt
Wald-haus
Prague
Saar-brucken
Paris
Nancy
Uzhgorod
St. Nazaire
Munich
Passau
Vienna
Budapest
Bern
Lyon
Milan
Ljubljana
Belgrade
La Spezia
Fos sur Mer
Barcelona
Madrid
Lisbon
Rome
Palermo
Algiers
Skikda
Tunis
Arzew
Ruhr gas 1984
1337

Fig.4


3°W
0°
5°E
10°E
14°E
62°N
61°N
60°N
60°N
55°N
55°N
51°N
10°E
50°N
4°W
0°
5°E
9°E
Basement rock at or within 1km of surface
Area of potentially petroliferous sediments
● Field in production and under development
○ Other discovery (○,● data as of 1/6/1985)
Median lines between sectors
—100— Water depths in metres
Existing pipelines
Troll/Sleipner to Zeebrugge/Emden lines
Statfjord
Troll
BERGEN
OSLO
SHETLAND
Frigg
Heimdal
ORKNEY
STAVANGER
Sleipner
NORWEGIAN
St. Fergus
ABERDEEN
Ekofisk
DANISH
ESBJERG
EDINBURGH
BRITISH
NEWCASTLE
DUTCH
GERMAN
HAMBURG
HULL
Emden
AMSTERDAM
ROTTERDAM
BELGIAN
ANTWERP
0 kms 150
1000
500
200
100
50

©EGI 114|85 add 102|87

Fig.5 The North Sea Basin showing Existing and Proposed Norwegian Gas Pipelines to Markets

EUROPEAN REFINING OUTLOOK

Presented by

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Madrid
Spain

The refining industry is one of the important elements in the logistics system for the supply of petroleum products. It is a crucial link and one of the most rigid ones, at least in the short term.

For several decades ending in the seventies the major oil companies ruled the system, and kept the markets supplied at fairly stable prices. They also set a pattern or even a model for global operation. In this model there was always a certain uneasy equilibrium between integration-centralization, on the one hand, and decentralization on the other. The issue was the global corporate interest versus the individual interests of the parts which in many instances were better served by affording those parts a larger degree of freedom.

In this scheme, and under the prevailing market conditions, refineries were in many cases little more than a retail shop for crude -a place where to run the crude produced, the underlying reason for opening the shop being that the profits were in the production stage.

There was very little glamour in refining. Crude prices were under control, demand fairly predictable, product qualities under little

environmental pressure, feedstocks available in quantity and of the required qualities, ... Since the system as a whole was very stable it was only logical that the most rigid part of the system be also the one most protected from commotions. When one took place, and they did occur, the shock wawes were largely absorbed by the more flexible elements in the logistic structure: crudes were shifted around, transportation rearranged, inventories built -or used-up, etc. Refinery runs, of course, also felt the wawes but the concept of the industry as such remained fairly constant: an expanding, slowly modernizing industry.

Under this system, the companies could "assign" a refinery margin to their refineries. Or to put it more nicely, they could let their refining affiliates, under a more decentralized system, compete for a fair share of the global profits.

Again under this system, refineries could be (and were) designed to run certain crudes. There was such a thing as "design crudes"; not "reference crudes", but really design crudes. Company A used Kuwaiti crudes in the design basis for their refining affiliates in Europe, while company B preferred Arabian crudes, possibly with a small percent of a Libyan running mate.

The oil world of 1987 is quite different, and the differences bear very heavily on the outlook of the European refining industry. For this reason it might be useful to place the analysis along the lines of those differences, to examine the changes that have occurred and are under way at present, and to attempt to draw from this examination the implications for the European refining industry.

Accordingly, this paper will review:

- the demand for oil
    - volume
    - structure
    - product quality.

- the refining industry
    - capacity
    - structure
- the economics
    - refinery margins
    - outside factors.

The scope of the review will be that of the industry in the European Community (EC) recently expanded to twelve members. (1) Figures for the years prior to the accession of the newer members have been adjusted to include them.

A. The Demand for Oil

Total oil consumption in the EC was 648 million tons in 1973; by 1980 it had dropped to 579 million, and to some 500 million tons in 1986 -a 23% drop since de oil price crisis of 1973. Except for small rebounds of demand in 1976 and again in 1978 and '79, the trend has been downward. The year of 1986 marked a new departure from the trend; oil consumption in the Community rose by 2.9%.

TABLE 1

OIL CONSUMPTION IN THE EUR-12

	Million Tons		% Change
1973	648	1973-80	(11)
1980	579	1980-85	(16)
1985	486	1985-86	2.9
1986	500		(23)

Sources: OECD, Eurostat, Commission of the EC, and own elaboration.

---

(1) Member States: Belgium, Denmark, W. Germany, France, Greece, Ireland, Italy, Luxemburg, Holland, Portugal, Spain, United Kingdom.

The first conclusion to be drawn from these figures is that the European refining industry began to face in 1973 a new situation -shrinking instead of expanding markets for its products. Turning points are difficult to identify. Almost fatally, inertia prevailed -mental and industrial inertia. On the one hand, it was very difficult at the time to depart from the traditional view and realize that we were in a new environment. On the other, and in line with traditional thinking which demanded that refining capacity be expanded by some much percent per year, there were a number of refining projects in the drawing boards. The blue-prints came out dutifully and construction took place. Refining capacity in Europe rose from 810 million tons in 1973 to a peak of 925 millions in 1979 -right up to the second oil price crisis. Thus, distillation capacity rose by 14% while product demand had already started to decline (3.5% in the same six years).

The impact upon the volume of oil refined by the European industry has been even larger, due to the reversal in the Community's external trade balance. From being a net exporter (27 million tons of finished products in 1973) it has become a net importer (18 million tons in 1986, after peak imports of 30 million tons in 1984).

Basically the same underlying reasons that brought about the decline in oil demand caused a significant change in its structure. The rise in oil prices in 1973 initiated not only a process of oil saving but also a process of oil substitution which was easier to pursue in the heavy industry. Between 1973 and 1975, fuel-oil consumption (ex-bunkers) in the EC dropped from 195 to 170 million tons. Starting in 1979, and propelled by the second oil price shock, the substitution movement accelerated significantly. By 1986 fuel-oil consumption in the EC was less than half that of 1979, 75 million tons.

The light end of the barrel was following different trends. Gasoline consumption kept growing fairly steadily at a slow pace. In 1986 it was 95 million tons from a level of 75 in 1973 (a growth of 1.8% annually). It is interesting to note that in 1984 gasoline consumption overtook that of fuel-oil and now is some 30% higher than the demand for this product. In 1973, fuel-oil more than doubled gasoline.

The trend of gas/diesel-oil has been more erratic. An initial decline down to 1975, growth again until 1979, new drop to 1983, and new rise in the last three years. Overall, middle distillates stand now at 170 million tons, just slightly below the 1973 level.

The effects of these trends in the structure of the European barrel can be seen in the following table.

TABLE 2

STRUCTURE OF OIL CONSUMPTION IN THE EUR-12. (Percent)

	1973	1980	1986
Gasoline	12	16	19
Gas/Diesel-Oil	28	29	34
Heavy Fuel-Oil (ex-bunkers)	30	28	15

Sources: ibid.

The third important change that took place on the demand side was a hardening of the quality requirements for petroleum products due to environmental reasons. The more significant change in specifications affect gasolines (lead content) and gasoils (sulphur content).

These are the basic demand data that have conditioned the evolution of the European refining industry in the last fifteen years. We can examine now how has the industry responded to the challenges posed by the changing scenario.

B. The European Refining Industry

Primary distillation capacity in the Community is now estimated at 600 million tons, down from a peak of 925 million in 1979. The decline since that year has been steady, although a certain slowdown in the rate could be detected in 1986.

When talking about refining in Europe we are dealing with an industry which represents about one fourth of the world's refining capacity (excluding CPE's).

This has been the first response of European refining to the new scenario: a quite drastic reduction in capacity.

The second response was a significant change in the configuration of the European refineries. The predominant mode of European refining for many years had been the hydroskimming refinery. This refinery was well suited to process medium to light crudes and produce a barril with some 30-40 percent of heavy products. It was an efficient, economical unit. However, the environment after 1973 and 1979 demanded flexibility in the qualities of the feedstocks and the ability to produce higher percentages of light products. More conversion was needed. In the last ten years, the percent (expressed in terms of primary distillation capacity) of "simple refineries" has dropped from 41% to 11%, and that of "complex refineries" evolved conversely. (1)

---

(1) The European Commission has adopted the following definitions:

- "Simple refinery": Primary distillation plus reforming and hydro-desulphurization.
- "Semi-complex refinery": "Simple refinery" plus visbreaking and thermal cracking.
- "Complex refinery": "Simple" or "Semi-complex" refinery plus cat- or hydro-cracking, or coking.

In this paper a simpler classification has been used. Refineries are grouped under two headings:

- "Simple": Primary distillation plus reforming and hydro-desulphurization.
- "Complex": "Simple" plus any type of conversion.

TABLE 3

EVOLUTION OF EUROPEAN REFINING STRUCTURE - EUR-12

Type of Refinery	1977		1986	
	Nº	%	Nº	%
Simple	88	41	24	11
Complex	63	59	77	89

Source: Commission of the EC, and own elaboration.

Total conversion capacity in the twelve, expressed in terms of catcracker equivalent, is estimated at 143 million tons, or a 24% of distillation capacity. Installed conversion capacity almost triples that of 1973. Capacities of the various conversion units are given in Table 4.

TABLE 4

PRESENT CAPACITY OF CONVERSION UNITS - EUR-12

(Million Tons)

TOTAL	CRACKING			VISBREAK.	DEEP CONVER.	
(Catcracker equiv.) (1)	Therm.	Catal.	Hydro		Coking	Other
143	18.5	81.8	13.5	51.7	6.4	1.6

----

(1) Conversion into Catcracker equivalent capacity:

Therm. cracking x 0.65; Catal. cracking x 1; Hydrocracking x 1.3; Visbreak. x 0.33; Coking x 1.7; Other x 2.1.

Source: Commission of the EC.

In terms of geographic distribution, the main European refining facilities are located as shown in the following Table.

TABLE 5

GEOGRAPHIC DISTRIBUTION OF EUROPEAN REFINING

	Distillation Capacity, %	Conversion Capacity, %
Italy	20	21
France	16	20
United Kingdom	15	18
W. Germany	14	13
The Netherlands	11	11
Spain	10	10

Source: Commission of the EC

The third great challenge to the industry comes from the new quality requirements for certain products. Directives 85/210 and 87/219 of the EC set the new specifications for motor gasoline and for gasoil. respectively. Lead content is limited to 0.4 grams/liter and encouraged to be reduced to 0.15. Unleaded gasoline, already widely used in some Member States, will be mandatory by the last semester of 1989. Sulphur content in gasoil is reduced, as from January 1, 1989, to 0.3% wt.. and there are already pressures under way to further lower it to 0.2%.

The projected penetration of unleaded gasoline in the European market is rather slow, moving from some 4% now to still under 20% by 1990. This gives European refineries time to introduce the changes needed to meet the new requirements of the gasoline pool.

The time table for desulphurization of distillates is tighter. Considerable work will have to be done between now and 1989, and very sizable costs incurred if the sulphur content is again reduced to 0.2%. This second level of desulphurization will be very costly for the industry.

C. The Outlook: Development Plans

A refinery is one of the most rigid industrial structures. Even additions or changes in units require long planning, design, and construction periods. Furthermore, once in place, there are usually quite definite operational limits: units cannot operate above or below certain rates; thay cannot operate with any type of feed; they cannot produce any range of product. Finally, refinery units face an environment where "change" is the predominant wind. Thus, refineries confront a not very enviable combination of circumstances: a quite rigid industrial structure and a rapidly changing market for its inputs and outputs. Adaptation is forcibly slow; on the other hand, it has to be an adaptation to the basic trends conditioning the medium and long-term profitability of the industry. The adaptation to short-range changes (and perhaps a condition of change is now a long-term characteristic of the environment) has to be attained through the introduction of flexibility into the refining structure. Flexibility is the name of the exercise now.

In this search for an adaptation to the new circumstances the European refineries will move along the following lines:

- Continued stream-lining of the industry. The reduction of distillation capacity is expected to continue. The target for 1990 is a primary capacity of about 575 million tons. The reduction will largely be concentrated on the scrapping of units rather than on the closing down of complete refineries. We may also see some re-rating of distillation capacities. The nominal capacity of some units was linked to a specific set of design crudes. The new market conditions have in effect reduced the capacity of those units to process their nominal throughput on a continuing and stable basis -the market has re-rated those units. Also, in some instances nominal capacity has been linked to official authorization and local market shares. As the market becomes freer, these strictures become less relevant; some refineries are already scaling down their capacities from the inflated official figures to the more realistic operational levels.

- Slowdown in the investment in conversion facilities. The main effort in this area has been largely completed. However, if the fuel-oil market were to continue shrinking, additional deep conversion units would be necessary after 1990.

- Acceleration of the installation of facilities to enhance octane in the gasoline pool and to desulphurize distillates. For octane. many refiners have elected the route of introducing high octane oxigenates in the gasoline pool. It is a rather quick and inexpensive way of increasing octane by blending. A different route is to resort to new units -reforming, isomerization, and alkylation. This is a more costly and slower route, but it attacks the problem at the root, it is a much more flexible option (the production of unleaded gasoline is not a fixed percent of any blending component), and it is compatible with the eventual addition of blending stocks to further increase the volume of low- or no- lead gasoline.

  On the distillate side, the actions needed do not involve the installation of any new type of facilities, just expanding or adding standard desulphurization equipment, and in some cases hydrogen recovery/producing facilities. However, the investment will be sizable, especially if sulphur content is further lowered to 0.2%.

D. Refining Economics

As in most activities also in refining the outlook is usually best summarized by looking at the bottom line in the P/L statement -or in this case at refinery margins. Except for very brief periods, the last then years have been characterized by low returns in refining. The oil companies have responded to declining volume and poor profitability with a number of measures designed to rationalize their downstream operations. To the structural changes mentioned in the preceding rubrics we should add the programs for energy saving, electricity generation, manning reductions, computer control, etc. All these efforts, structural and operational, had the effect of reducing costs but were not really sufficient to generate adequate profits. Margins remained depressed by a world-wide surplus of capacity.

In 1986 the situation changed. The conditions in the oil market made it possible to restore profitability to refining operations. It is true that a great streamlining effort had been made in the preceding years but it is not less true that improvement in refinery margins was largely due to developments totally outside the refining industry. The industry was not significantly in better shape in 1986 than in 1985, yet its fortunes were quite different. The drop in crude prices which started in late 1985 afforded the companies the possibility of delaying its transmittal to the market, and even the opportunity of keeping part of the reduction into the system. Margins rose noticeably. As crude prices started to firm up again in the second part of '86 and in '87, refinery margins started again to decline. Now the time lag between crude and product price moves works against the refiners.

Charts 6 summarizes the basic trends of the '80s and may even provide some indications about the future. The following points stand out:

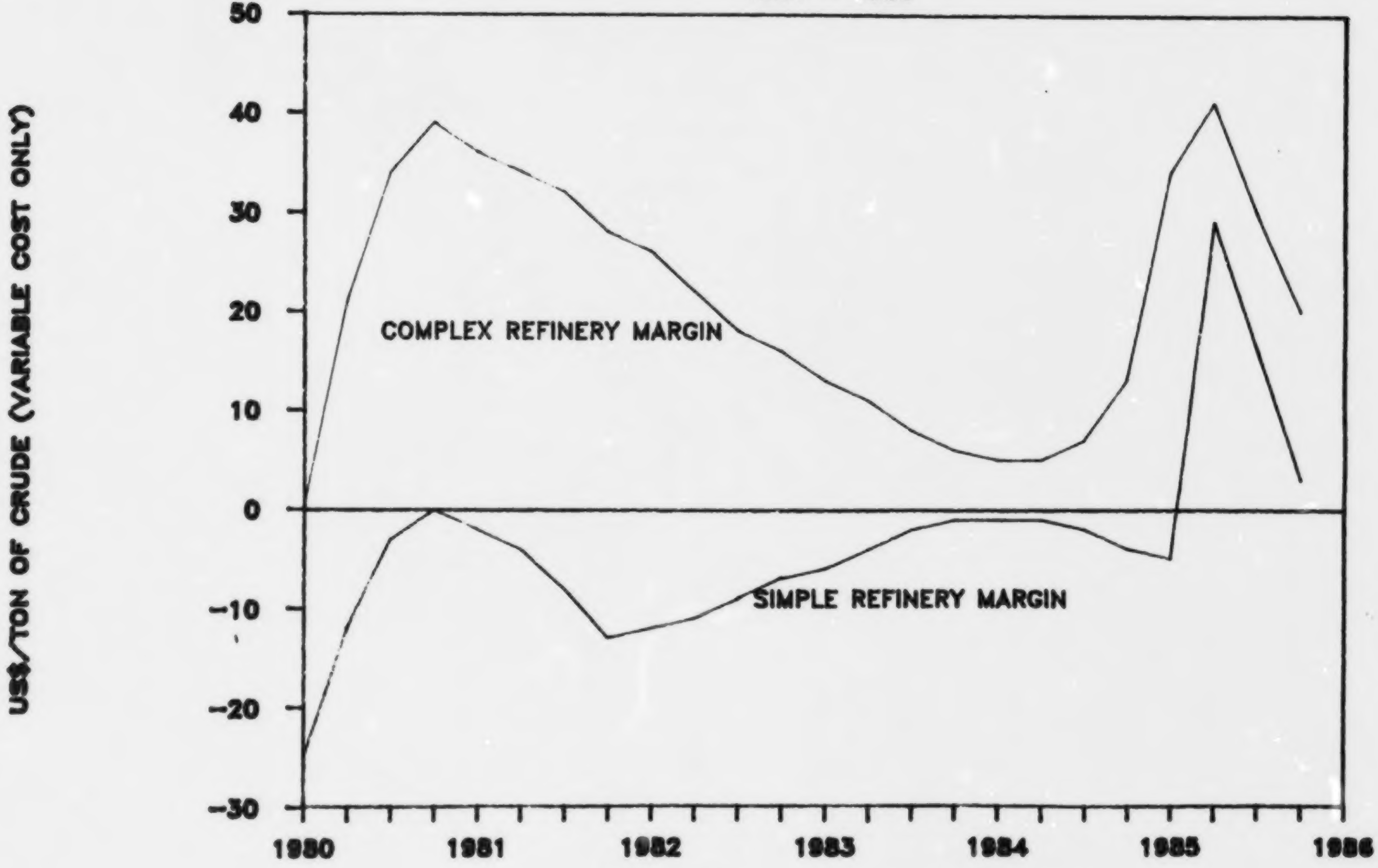
- The profitability of "simple" refineries has been consistently negative during the period. The pick-up of 1986 was helped by the fact that there was a certain revival of fuel-oil consumption. This represented a premium for hydroskimming installation.

- The long-term outlook for these facilities is bleak, unless they are integrated into a wider system (to which they may supply feedstocks, for example), or enjoy special market or location advan-

CHART 6

TRENDS IN EUROPEAN REFINERY MARGINS

1981 – 1986



SOURCE:COMMISS. OF THE EC AND OWN ELAB.

tages (nearness to a large consumption center of heavy products).

- "Complex" refineries have consistently shown much higher returns than "simple" ones. Returns appear to be affected by market considerations much more than by operational reasons. "Complex" refineries are, not surprisingly, more sensitive to the market.

Even recognizing the limits to the effectiveness of the actions that the industry can take to improve its profitability, the Community has placed considerable emphasis on the reduction of distillation capacity as a means to achieving higher utilization rate and thus establishing solid ground for a return to satisfactory margins. The DG XVII (Directorate General of Energy of the EC) has expressed on a number of reports its views on the outlook of the European refining industry. The reports also contain policy opinions about possible courses of action (need for further conversion under certain oil price scenarios; or for new facilities to cope with more stringent specs. etc.), but really the main policy guideline is the need to reduce capacity in order to achieve a better utilization rate.

During the decade ending in 1985 the average utilization rate of European refineries was always below 70%, except for 1985. For two years (1981 and 1982) it even went below 60%. The continuing reduction in distillation capacity combined with the increase in consumption in 1986 have resulted in an utilization rate estimated at 79%. Another conjunctural factor contributing to this higher rate was the significant increase in processing arrangements in European refineries.

The EC has set a target utilization rate for primary distillation capacity of 80%. This goal is expected to be attained by 1990, provided oil prices stay fairly stable at about $ 20/bl, thus allowing oil consumption to remain at its present level over the period 1986-90. The scenario includes imports of finished products into the Community of some 40 million tons/year. There is something almost mythical attached to this figure which appears repeatedly in reports and comments of EC officials without much further elaboration. It probably responds to some fine political and economic assessment of what volume of imports the Community ought to take. The only proviso that is made is that the EC assumes that everyone will take a fair share of imports, e.i., that products from Middle East and North African export refineries will be distributed among the main importing regions in accordance with market forces. This would mean, for example, no import tax on oil products and no artificial obstacles to oil products trade. The proviso is clearly directed to other OECD members not in the European Community.

The utilization rate of conversion capacity is generally over 80%. Most companies have found if profitable to run their conversion units "flat out" in order to maximize the output of high value-added products, obtaining the balance of their needs for the heavier end of the barrel in the market.

E. The impact of Netback Pricing

It is estimated that in November of 1985, when the crude price slide started, OPEC was selling under netback pricing arrangements some 2 million barrels/day, or a 14% of its exports. By January of 1986 the volume of netback sales had more than doubled, reaching the 5 million b/d level, according to the same estimate.

During those months and the following semester one could get the impression that netback pricing was the saving grace of European refining. This pricing mechanism did achieve two very important things for refiners:

- one, it contributed to the fall in oil prices and to its acceleration in certain months. This was the key factor -the sharp downward slide.

- two, it provided a net for refiners. Purchasing oil is a falling market in a risky business. Netbacks removed much of that risk and had the effect of assuring a margin to the refiner.

However, the key element was the price fall, and this was not caused by netbacks although they contributed to reinforcing it. Netbacks assured a margin, but the fall in prices permitted to expand that margin. Companies could easily delay transferring to the market the fall in crude prices. Further, the repercusion, when effected, could be less than total; a part could be retained to strenghten the financial position of the companies. In fact, these acted in many ways like many governments in Europe which delayed the reduction in product prices and kept part of the bonanza in the treasuries via higher taxes. This is fairly easy to do when prices fall. The citizenry is happy enough with prices falling by any amount and does not usually claim a full transmittal of benefits.

The full impact of the price fall was, of course, borne by the producers to such extent that it became clear that the situation was not tenable in the long -or even in the medium-term. The correcting steps -return to official pricing, phasing out of netback deals. stricter adherence to production quotas- went into place as from mid-'86 and prices firmed up very satisfactorily for the producing countries.

However, the mechanism of netbacks was not without merits for some producers. By pricing around the time of delivery a producer could turn a long-haul crude into a short-haul for any refiner, thus reducing the time risk between the time of buying and that of realization. In the present environment both refiners and some producers are trying to retain some of the beneficial effects of buying crudes from close origins by acquiring crudes actually close or made so instrumentally.

F. Other Trends

In the short or even the medium-term there is relatively little that the individual refiner can do to cope with major shifts in market conditions. Yet these shifts have occurred quite rapidly in recent years and have brought about changes of considerable significance. The depth and breath of the repercussions appear quite clearly in the tables in this paper.

For these reasons it is important to try to unveil trends at an early stage so as to be able to adapt in time to the emerging changes. The more relevant tendencies have been reviewed in the preceding rubrics. A mention should be made, however, of two other points.

- the role of Middle East producers in the West European oil sector, and
- the reintegration of the oil industry.

The two points are not unrelated, nor can they be separated from the main arguments explored before.

The Community has a reference target of net imports of finished products of 40 million MT by 1990, equivalent to 8% of internal consumption. In 1986 total imports amounted to 102 million tons; nearly half of the volume was in the form of semi-finished products necessitating further processing or chemical conversion.

As to the origin of imports, almost one half (44%) came from developing countries . The largest growth in recent years comes from OPEC countries. Libya increased its exports by 190% in 1985 and 46% in 1986: Saudi Arabia similarly showed increases of 49% and 20%, respectively. This surge in export activity should be seen as a reflection of the coming onstream of new export refineries in the countries in question. Thus, the driving force behind the increase is really the need of the exporters rather than the need of the Community.

These developments are sequels of the larger, deeper trends mentioned before. The slump in oil demand drove some producing countries to searching for ways to ensure the continuity of supplies. A second consideration was to obtain some added value from local production, but foremost was the intent to guarantee a market. To this end, some producers initiated a policy of constructing refineries in their own countries. The objectives were to supply local needs and to export products to Western markets supplementing (or complementing) crude exports. But exports is admittedly a weak way of gaining a foothold in a market, especially in a buyers market dealing with homogeneous products.

The next logical step was for producers to try to gain a direct foothold on European markets by investing in refining and/or direct marketing. The moves in these directions are well known. Libya and Kuwait have been particularly active in these respects.

The price crisis of 1973 and 1979 brought about a definite retrenchment of activities by the major oil companies in several directions: they curtailed their commitment to certain activities and they ceased or reduced operations in certain countries. In the process, they became less integrated in the sense that their control on some critical stages of the logistics system diminished significantly. But these retrenchments probably had the intent of reinstating integration although on a smaller operational and geographical base (and on a closer-to-home base).

Integration started also at the other end of the industry, with the producing countries. They had gained control of their own resources and wanted to secure a market, an added source of profitability for them. Their (modest) penetration of European markets may be seen as part of a trend towards greater integration of the industry.

What are the consequences of these developments for the European refining industry? The answer is a balance of two conflicting trends. To the extent that export refineries in producing countries consolidate their operations and reach higher utilization rates they will bring pressure on the European markets and its refineries. On the other hand, the direct participation of producers in European refineries and marketing will contribute to the general stability of the system. The system becomes more integrated and therefore the tendencies to pull it apart, or for one part to work against another one, diminish. In this sense, producing countries interest in the European oil sector has a beneficial effect.

CONCLUSION

The refining industry is just one part, and probably the most rigid one, of the petroleum sector, and it is not sheltered from the changing winds of the market.

Since the mid 70's, the market has undergone considerable changes: demand dropped substantially, its structure experienced a major shift, and product quality placed increasing pressure of refinery facilities. The adaptation moves made by European refiners have been significant, and painful. The problems have been made more acute by the retrenchment of activities by some oil companies.

At present, the industry:

- has well under way its process of shedding excess capacity,
- has largely completed its structural reconversion, and
- is making progress in its plans to cope with more stringent product specs.

The groundwork for a more stable development has been made, although the rather favorable operational outlook should not obscure two facts: one, the fact that in certain countries the refining industry lags considerably behind in its reestructuring efforts. Two, profitability continues to be a problem. Except for a brief interlude from the end of 1985 to mid-1986 the margins of hydroskimming refineries have been negative and those of more complex installations barely adequate to cover variable costs.

The presence of producing countries companies on the European scene should be viewed as a positive development. A more integrated oil sector will probably be a more stable one and also one more sensitive to the need to provide adequate margins to the different parts of the system.

* * *

In the first paragraph of this paper the refining industry was described as one of the links in the logistics system for the supply of petroleum products —a crucial and rigid link. It is possible that some of the problems of the industry derive from this structuring of the system: when circumstances changed and demanded a flexible response the flexibility was sought in other parts of the logistics chain. The large, integrated organizations did not probably feel that there was a pressing need to do anything in refining; other parts of the system could cope with change.

The small, independent refiner was in a quite different position: his flexibility had to be built around his refinery or refineries. This resulted in two different courses of action. First, great efforts were made to identify changes at an early stage and to invest decisively in the refining facilities needed to face, and even anticipate, those changes. Second, the refinery was not treated just as a separate cost center. On the contrary, a clear effort was made to integrate the refining and the supply functions. Supply considerations were foremost in the preparation of running plans, in inventory policy, in investment decisions, etc. It was no longer a case of running a refinery but of running a company.

Going one step further one could say that some organizations thought that refineries were in the refining business. Others considered that they were in the supply business.

The above description is intentionally drawn with a broad brush. The intent was to show that the integrated companies have paradoxically run their refineries in a rather non-integrated way. This is part of the internal logic of the system —the separate cost centers. But along the way the system may have lost some of the uniting thread that gives coherence to all actions and in the final analysis is at the core of "the internal logic" of the system.

These considerations lead me to propose that the refining industry in Europe faces a twofold challenge. On the one hand, it should continue its efforts to improve efficiency —efficiency in energy use, in cost control, in adequacy of installations, etc. On the other hand. it should consider itself as a link needing as much flexibility as other parts of the system. To achieve this, it would be advisable to give refining a prominent place in the framing of the supply question —to integrate it more fully in the considerations that preside the economics and the major decisions of oil companies.

The outlook for the European refining industry is now clearer and sounder than a decade ago. Maintaining it so and improving the prospects will continue to demand considerable efforts in investment and probably a new approach to strategic decision making. Refineries can be viewed just as processing mills —and lose money, or they can be made integral parts of corporate strategies and actions— and then have a fairer probability of being efficient, flexible, and profitable.

* * *

Calgary, Alberta
September 27-29, 1987

OIL AND GAS SUPPLY DEVELOPMENTS
THE BRAZILIAN PERSPECTIVE

PRESENTED BY

OZIRES SILVA
PRESIDENT
PETROLEO BRASILEIRO S.A. - PETROBRAS
RIO DE JANEIRO

AT

THE SIXTH ANNUAL
INTERNATIONAL OIL AND GAS MARKETS CONFERENCE
SEPTEMBER 27-29, 1987
CALGARY CONVENTION CENTRE
CALGARY, ALBERTA

OIL AND GAS SUPPLY DEVELOPMENTS
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RIO DE JANEIRO

A. PETROBRAS

In Brazil, the state-controlled company PETROBRAS is responsible for the supply of petroleum and oil products throughout the nation.

PETROBRAS was established in 1953, but it got off to a relatively slow start, being endowed by the National Petroleum Council with only a few assets such as one small refinery, a couple of tankers and an oil production of 2700 barrels per day.

(FIGURE 1 - PETROBRAS GROUP)

At the present time, 34 years after its founding, the company has grown, diversifying its activities to include petrochemistry, distribution, fertilizers and mining, and has put together a tightly knit technical corps that's generated or absorbed a host of technologies which enables it to compete worldwide in the most sophisticated markets.

B. THE SUBSIDIARIES

In order to better meet the growing needs of the Brazilian Market,PETROBRAS expanded and decentralized, setting up an industrial and commercial complex comprising more than 100 companies and six main subsidiaries:

- In petrochemistry, Petroquisa was established in 1967, and since then has been focusing its investments on the production of basic inputs required for the nearly infinite applications of a wide range of petrochemical products. These investments made viable the implantation and operation of three petrochemical complexes in Brazil, with a new unit currently being studied.

- In distribution, a subsidiary using the trade name $\overline{\text{BR}}$ was set up in 1971. It now has around 5200 service stations spread across the Country. $\overline{\text{BR}}$ holds about 38% of the domestic market, sharing it with Shell, Esso, Atlantic, Texaco and a number of smaller companies.

- In the field of fertilizers, Petrofértil was founded in 1976, bringing the benefits of petrochemistry out to the countryside, impelling agriculture toward broader horizons.

- In mining, PETROMISA, created in 1977, is engaged in exploring mineral alternatives made viable by PETROBRAS itself, producing potassium chloride discovered while drilling for oil.

PETROBRAS is also active on an international scale. Two subsidiaries were set up to operate on a worldwide basis, making the mane "PETROBRÁS" fairly well known in a number of countries on just about all the continents.

- The first, BRASPETRO, was established in 1972 with the basic intention of expanding Brazil's alternatives in her oil supplies. It has worked in 18 countries and is currently operating in Angola, Colombia, Ecuador and Norway, providing oil exploration and production services and technical assistance, not to mention the supply of such "Made-in-Brazil" equipment as offshore production platforms.

- A former BRASPETRO division, INTERBRÁS was set up as a subsidiary in 1976 to operate as a trading company in order to boost Brazilian Exports. Last year, it exported more than one billion dollars worth of commodities, manufactured goods, services, and petrochemicals among others. Its diversified activities represent an important presence by Brazil in international commerce.

(FIGURE 2 - PETROBRAS IN THE WORLD)

C. EXPLORATION AND PRODUCTION

Despite the peculiar difficulties of brazilian sedimentary basins, and thanks to the continuous dedication of our people, it's been possible for PETROBRÁS to increase known hydrocarbon reserves within the nation's boundaries, putting Brazil on the oil production map.

(FIGURE 3 - AREAS OF PRODUCTION IN BRAZIL)

A major contribution towards this accomplishment has been the company's investment program in exploration and production during the past several years.

(FIGURE 4 - PETROBRÁS INVESTMENTS)

In 1986, with gross operating revenues of 17.5 billion dollars, PETROBRAS invested 1.28 billion dollars in production and 508 million dollars in exploration, adding up to 1.78 billion dollars or some 88% of its total investments during that year.

(FIGURE 5 - THE WORLD's TOP OFFSHORE OPERATORS)

Our plans for 1987 involve investments on the order of 2.3 billion dollars, out of which 1.8 billion, or 75%, are earmarked for oil exploration and production. In all likelihood, this will secure PETROBRAS' position as the world's top offshore operator.

Because of this investment effort, Brazil' s hydrocarbon reserves have also been continuously growing.

(FIGURE 6 - GROWTH OF HYDROCARBON RESERVES)

Today, our known reserves amount to approximately 2.4 billion barrels of oil and 100.9 billion cubic meters of gas.

Naturally, accompanying the increase in oil and gas reserves, there have been considerable gains in production.

(FIGURE 7 - OIL AND LNG PRODUCTION IN BRAZIL)

(FIGURE 8 - NATURAL GAS PRODUCTION)

PETROBRÁS now produces about 596,000 barrels of oil and 16.2 million cubic meters of gas per day, with the oil figure representing roughly 60% of Brazil's total current oil consumption. The importance of this can be better seen in FIGURE 9.

(FIGURE 9 - EVOLUTION OF OIL CONSUMPTION VERSUS OIL IMPORT EXPENDITURES)

D. THE ROLE OF OFFSHORE PROSPECTING

The search for more oil and gas led PETROBRÁS to prospect the sea. Initial discoveries in relatively shallow water off Brazil's Northeastern Coast kept on growing until the discovery of important deposits off the northern coast of the state of Rio de Janeiro: the so-called Campos Basin which holds 90% of Brazil's offshore oil reserves and 72% of her offshore natural gas reserves. In overall terms, this represents 60% and 36% of Brazil's total oil and gas reserves,respectively.

(FIGURE 10 - THE CAMPOS BASIN)

The need for a quick increase in domestic production as of 1974 was the main reason why PETROBRAS seized upon the expedient of adapting floating drilling units with the idea of speeding up production of the oil offshore in the Campos Basin.

During the course of a decade using floating production systems, PETROBRAS acquired a stock of experience that has allowed it to develop floating systems even further, making them more than mere temporary expedients, but rather a highly recommended method for a permanent alternative to produce from marginal and/or deep water fields.

To give you an overall idea, there are 11 floating production systems operating in the Campos Basin besides seven fixed steel platforms installed in water ranging from 110 to 170 meters in depth. Each day, some 360,000 barrels of oil - - 60% of brazilian production - and 6.2 million cubic meters of gas - 39% of the country's output - are produced there. An additional seven platforms are presently under construction and scheduled to start producing by mid-1988, with a peak production of 100,000 barrels per day planned to be reached during the following year.

(FIGURE 11 - PIRAÚNA/MARIMBÁ - FLOATING PRODUCTION SYSTEM

Based upon its experience installing and operating deep water production systems, PETROBRÁS has been overcoming obstacles and creating new and useful technology. In January 1987, the 3-RJS-294 was completed for production in water 411 meters deep, thereby becoming the new world record holder for deep water sub-sea production wells.

This progressive domination of technology to produce oil and gas at the 400 meter mark opens vistas for PETROBRÁS to economically extend such technology out even further within the near future - maybe going out to water as deep as 2,000 meters. There's a good reason for doing so. Two giant fields were recently discovered Albacora and Marlim - whose combined deposits will most probably double Brazil's known oil reserves and triple its reserves of gas.

We recently made the world's deepest water drilling test with the RJS-367 at 1,565 meters. Technological frontiers still remain to be crossed, but we expect to face and overcome these challenges with perseverance, confidence and lots of hard work.

E. OTHER ACTIVITIES

In addition to PETROBRAS' performance in oil and gas exploration and production in Brazil, other activities deserve highlighting since they also bear a lot of weight on the huge range of activities required to supply a country the size of Brazil.

In order to help us overcome technological barriers, PETROBRAS counts on the services of a Research and Development Center employing around 1700 workers, about one half of whom are college graduates, named "CENPES", the Center deals with every kind of project and study required to improve the company's technical skills, not only involving research and development in exploration and production, but also in drilling, refining as well as oil and gas transport and handling.

In refining, with 10 refineries strategically located at various points of the nation plus and asphalt plant, more than 1,3 million barrels are processed daily at the present time, ielding oil products for the domestic market as well as products for export. Continuous efforts are put forth to achieve a refining profile matching the demand structure for oil products in Brazil as closely as possible. This structure has been undergoing substantial changes as we can see in FIGURE 12.

(FIGURE 12 - DEMAND STRUCTURE FOR OIL AND ALTERNATIVE ENERGY PRODUCTS)

(FIGURE 13 - FRONAPE - PETROBRAS' TANKER FLEET)

We handle and move a great deal of oil and derivative products all over the world. PETROBRAS' tanker fleet presently consists of 71 vessels totaling more than five million deadweight tons. In addition, the company operates a network of oil and gas pipelines interconnecting 27 operational facilities such as terminals, refineries and production fields which are spread all over Brazil. These pipelines run more than 6200 kms in length.

More than 58 million barrels of crude, petroleum derivatives and alcohol fuel can be stored at our terminals - nine in number. Our largest terminal - TEBIG - also the largest in Latin America, is able to take on tankers of up to 500,000 DWT.

And finally, in terms of trade, PETROBRAS is probably the world's single largest oil buyer. This puts us in a privileged position with the world's main oil suppliers.

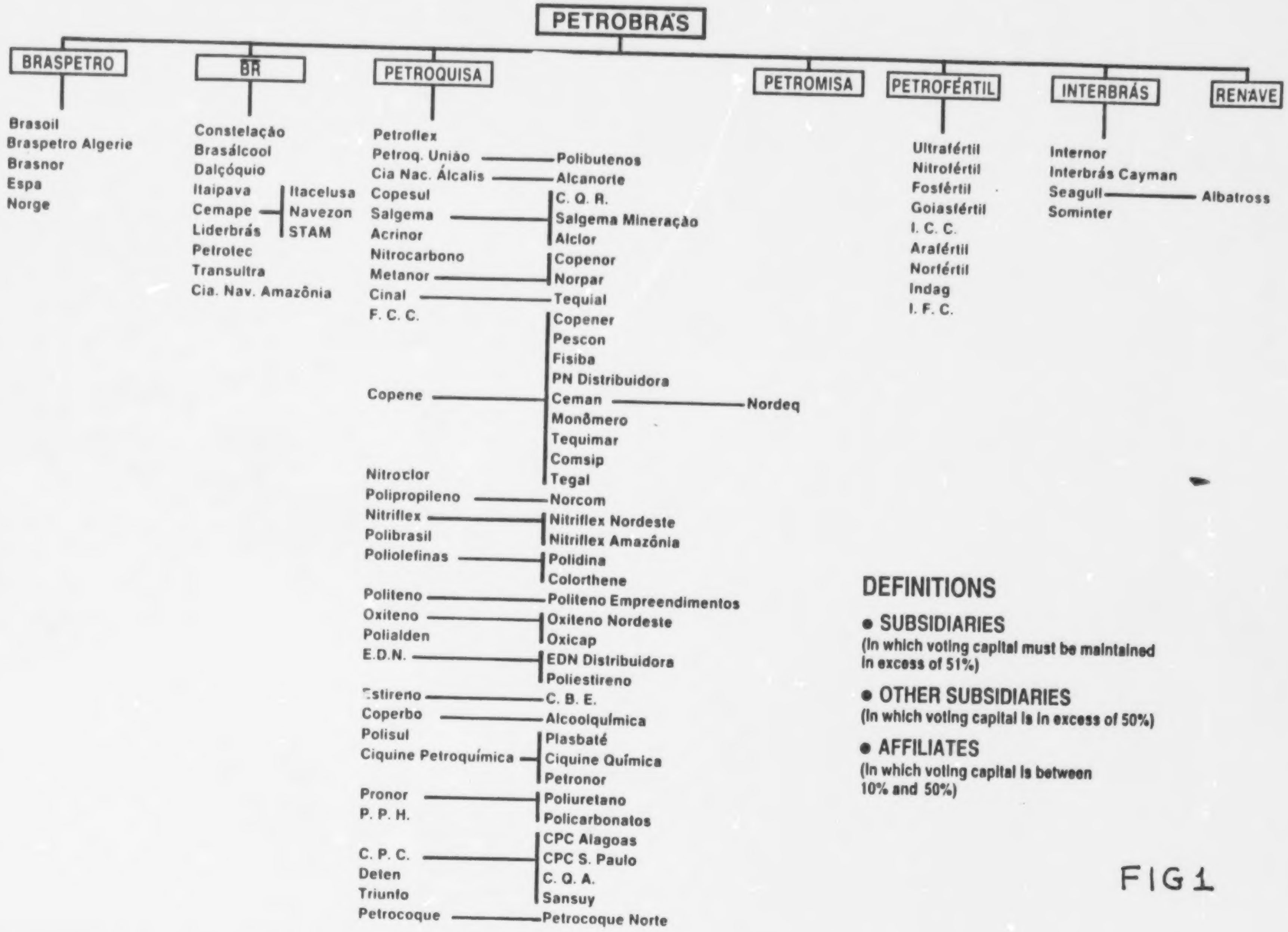
(FIGURE 14 - GROWTH OF EXPORTS - PETROBRAS GROUP AND BRAZIL)

The PETROBRAS GROUP promotes ongoing sales of various products in more than 30 countries. In 1986, these sales added up to 2.5 billion dollars, corresponding to more than 11% of total brazilian exports. This rather substantial trading volume is bound to grow even further according to studies presently under way which aim at consolidating and enlarging PETROBRAS' presence on the international market.

F. CONCLUDING REMARKS

In short, this has been a quick outline of the world of PETROBRAS.Thirty-four years have elapsed since it was founded. We can look back into the past and see that a great deal has been accomplished.

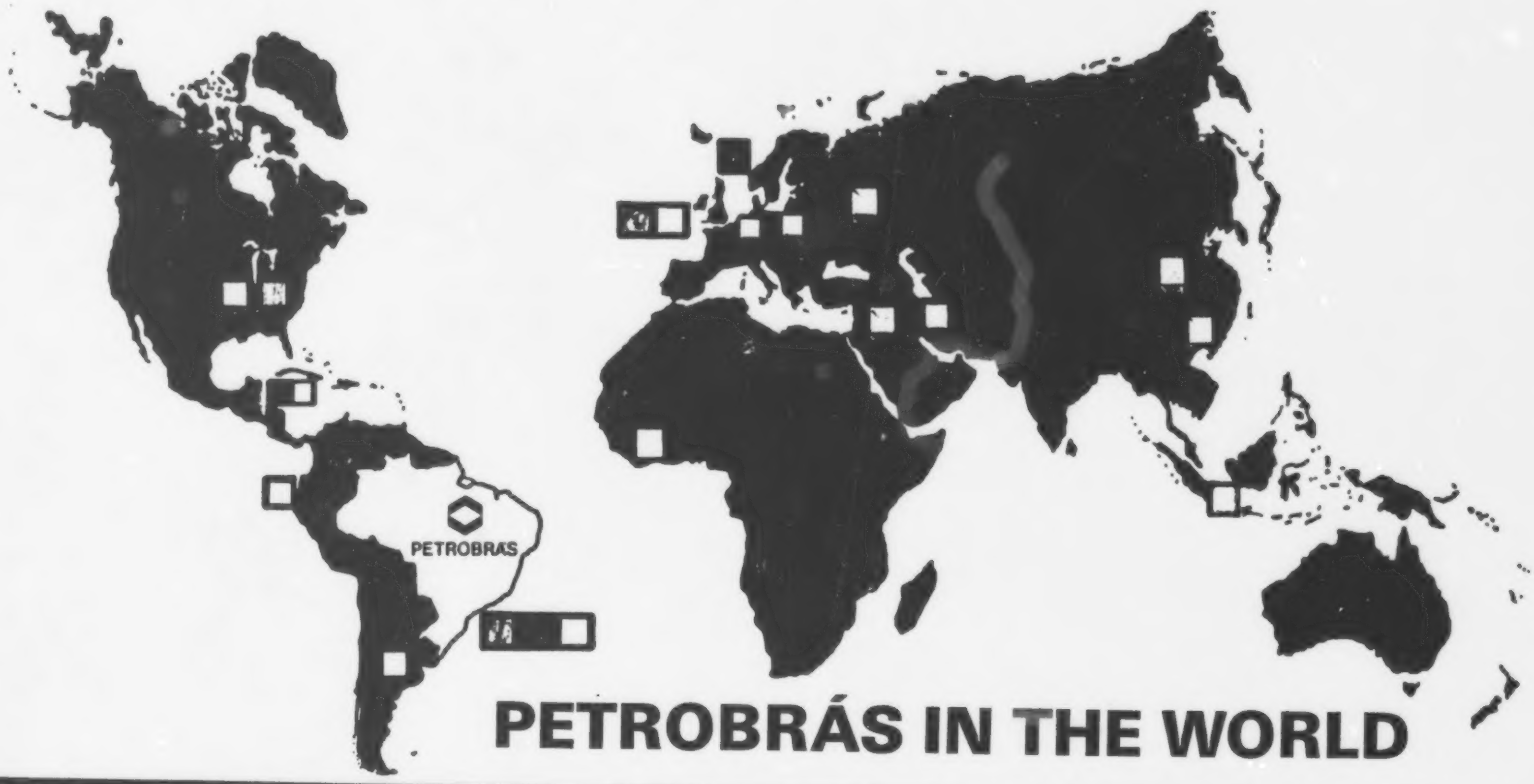
PETROBRAS GROUP


PETROBRÁS
BRASPETRO
Brasoil
Braspetro Algerie
Brasnor
Espa
Norge
BR
Constelação
Brasálcool
Dalçóquio
Itaipava
Cemape
Liderbrás
Itacelusa
Navezon
STAM
Petrotec
Transultra
Cia. Nav. Amazônia
PETROQUISA
Petroflex
Petroq. União
Polibutenos
Cia Nac. Álcalis
Alcanorte
Copesul
Salgema
Acrinor
C. Q. R.
Salgema Mineração
Alclor
Nitrocarbono
Metanor
Copenor
Norpar
Cinal
Tequial
F. C. C.
Copene
Copener
Pescon
Fisiba
PN Distribuidora
Ceman
Nordeq
Monômero
Tequimar
Comsip
Tegal
Nitroclor
Polipropileno
Norcom
Nitriflex
Polibrasil
Nitriflex Nordeste
Nitriflex Amazônia
Poliolefinas
Polidina
Colorthene
Politeno
Politeno Empreendimentos
Oxiteno
Polialden
Oxiteno Nordeste
Oxicap
E.D.N.
EDN Distribuidora
Poliestireno
Estireno
C. B. E.
Coperbo
Alcoolquímica
Polisul
Ciquine Petroquímica
Plasbaté
Ciquine Química
Petronor
Pronor
P. P. H.
Poliuretano
Policarbonatos
C. P. C.
Deten
Triunfo
CPC Alagoas
CPC S. Paulo
C. Q. A.
Sansuy
Petrocoque
Petrocoque Norte
PETROMISA
PETROFÉRTIL
Ultrafértil
Nitrofértil
Fosfértil
Goiasfértil
I. C. C.
Arafértil
Norfértil
Indag
I. F. C.
INTERBRÁS
Internor
Interbrás Cayman
Seagull
Albatross
Sominter
RENAVE

DEFINITIONS

- **SUBSIDIARIES**
  (In which voting capital must be maintained in excess of 51%)
- **OTHER SUBSIDIARIES**
  (In which voting capital is in excess of 50%)
- **AFFILIATES**
  (In which voting capital is between 10% and 50%)

FIG 1



PETROBRÁS IN THE WORLD

■ PETROBRÁS

Headquarters in Rio de Janeiro
New York Office
London Office

■ BRASPETRO

Headquarters in Rio de Janeiro
Brasoil Grand Cayman, Georgetown, Cayman Islands
Brasoil Libya
Brasnor Neptun, Bergen, Norway
Braspetro Norge A/S, Stavanger
Braspetro Angola, Luanda
Brasoil Angola, Luanda
Braspetro Colombia
Office in Paris
Braspetro Ecuador, Quito

■ INTERBRÁS

Headquarters in Rio de Janeiro
Internor Trade Inc. New York
Interbrás Cayman C.º, Georgetown, Cayman Islands
Seagull Trading C.º, Georgetown, Cayman Islands
Branch in Buenos Aires, Argentina
Branch in Quito, Ecuador
Branch in Hong Kong
Commercial Agency in Beijing, China
Representative in Berlin, East Germany
Representative in Rotterdam, Netherland
Representative in London, England
Representative in Baghdad, Iraq
Representative in Teheran, Iran
Representative in Moscow, USSR
Representative in Singapore, Singapore
Representative in Abidjan, Côte D'Ivoire

FIG 2

PETROBRÁS

AREAS OF PRODUCTION

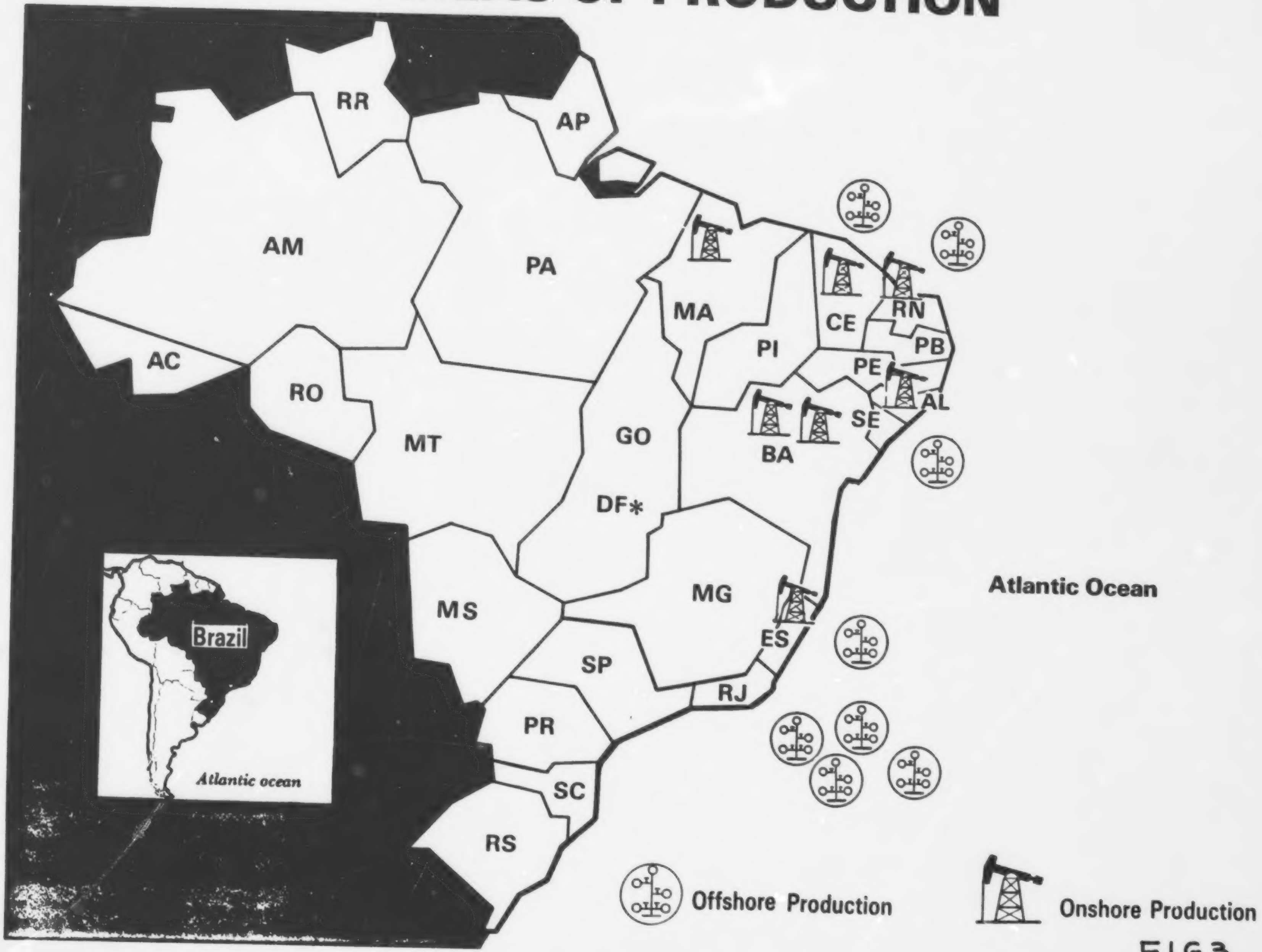

RR
AP
AM
PA
MA
CE
RN
PB
PI
PE
AL
AC
RO
SE
BA
MT
GO
DF*
MG
ES
MS
SP
RJ
PR
SC
RS
Brazil
Atlantic ocean
Atlantic Ocean
Offshore Production
Onshore Production

FIG3

PETROBRÁS

INVESTMENTS OF PETROBRÁS

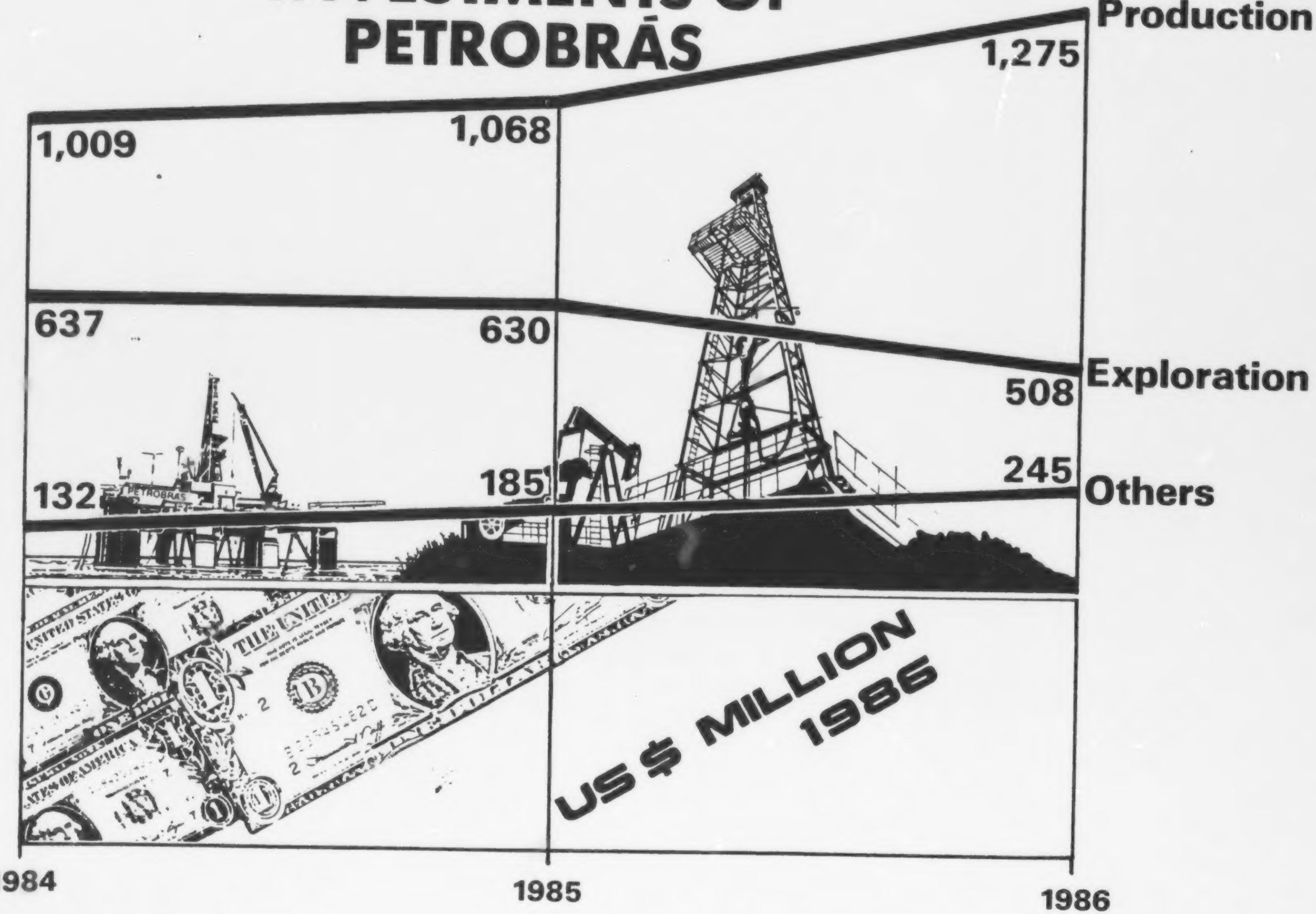
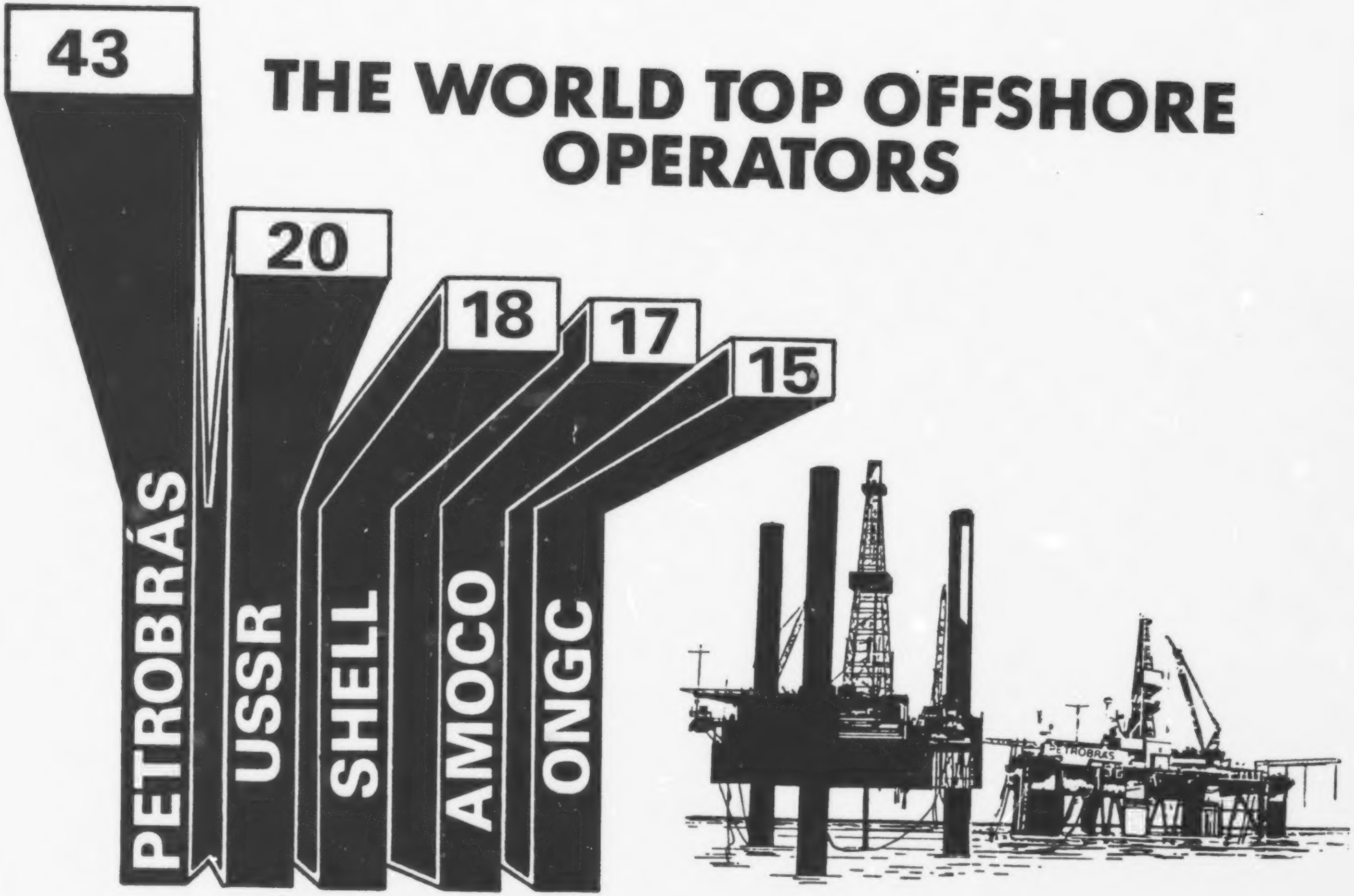


FIG 4

PETROBRÁS

THE WORLD TOP OFFSHORE OPERATORS



Number of offshore drilling units in operation.

Source: "Offshore Rig Locator" - June 1987

FIG 5

PETROBRAS

GROWTH OF HYDROCARBON RESERVES

(Gas shown in oil equivalent)
Reserves 10^6 bbl

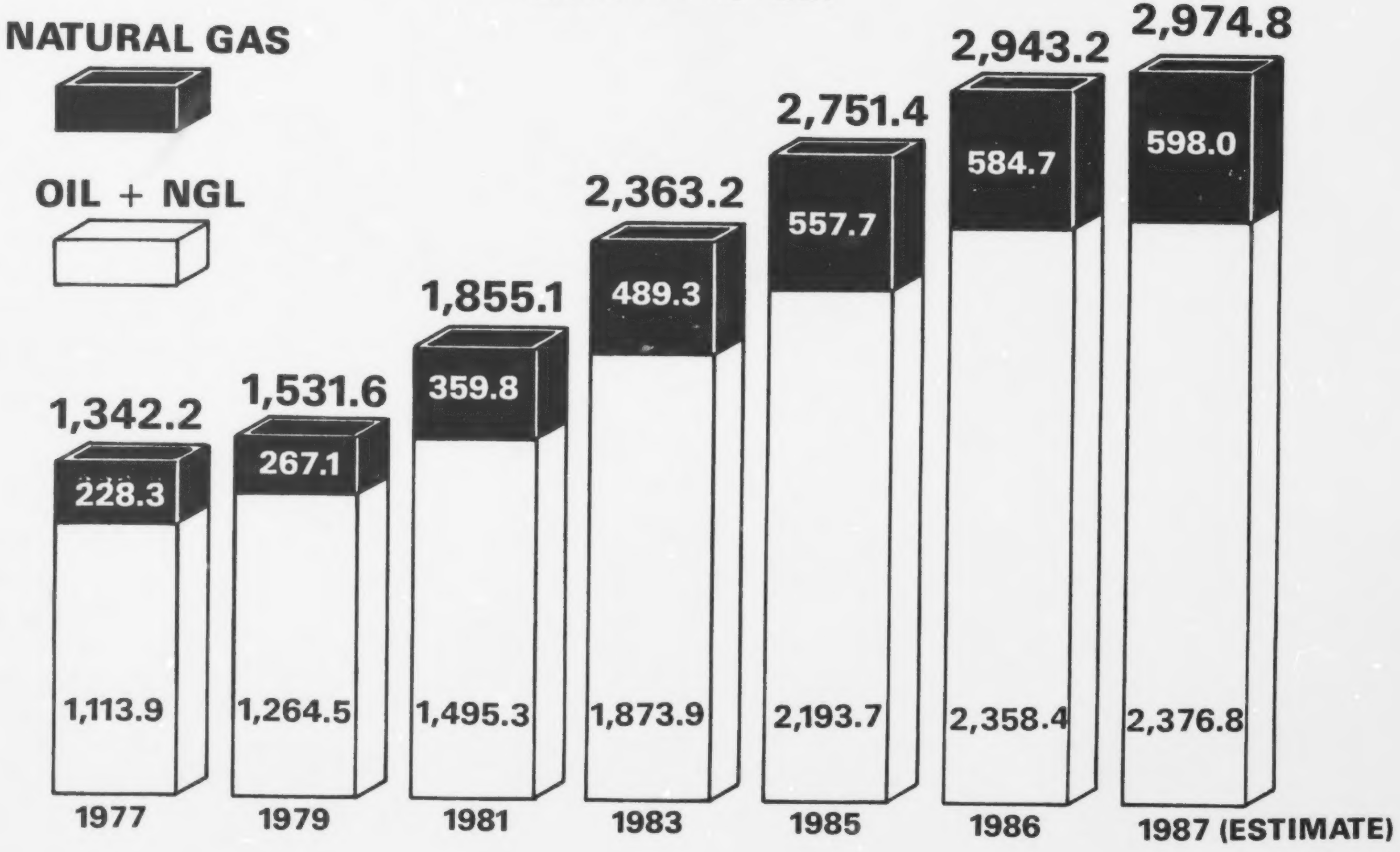


FIG 6

PETROBRAS

OIL PRODUCTION (PLUS NGL) IN BRAZIL

(Thousand barrels per day-average)

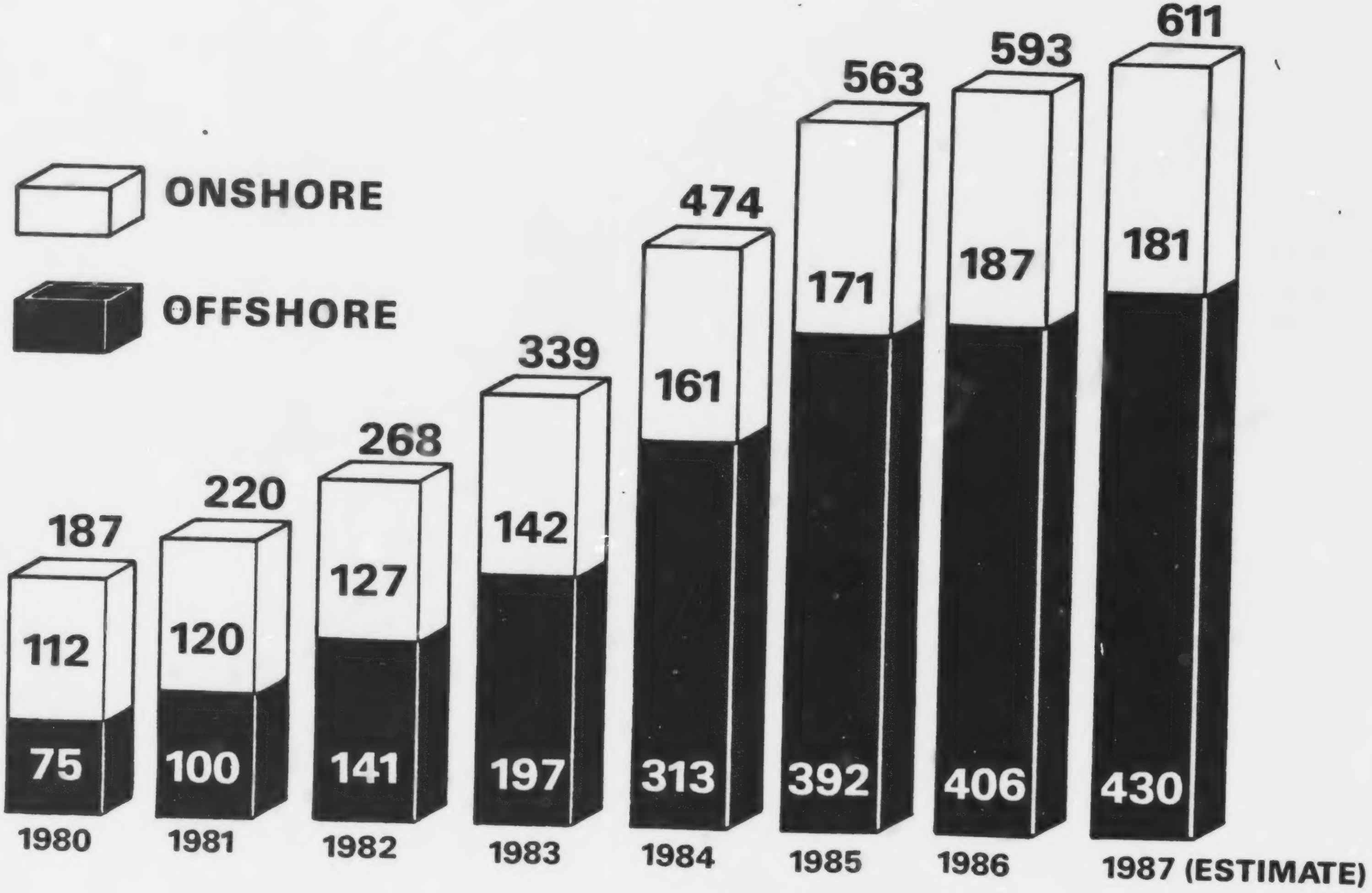


FIG 7

PETROBRÁS

NATURAL GAS PRODUCTION

1,000 cu m/d

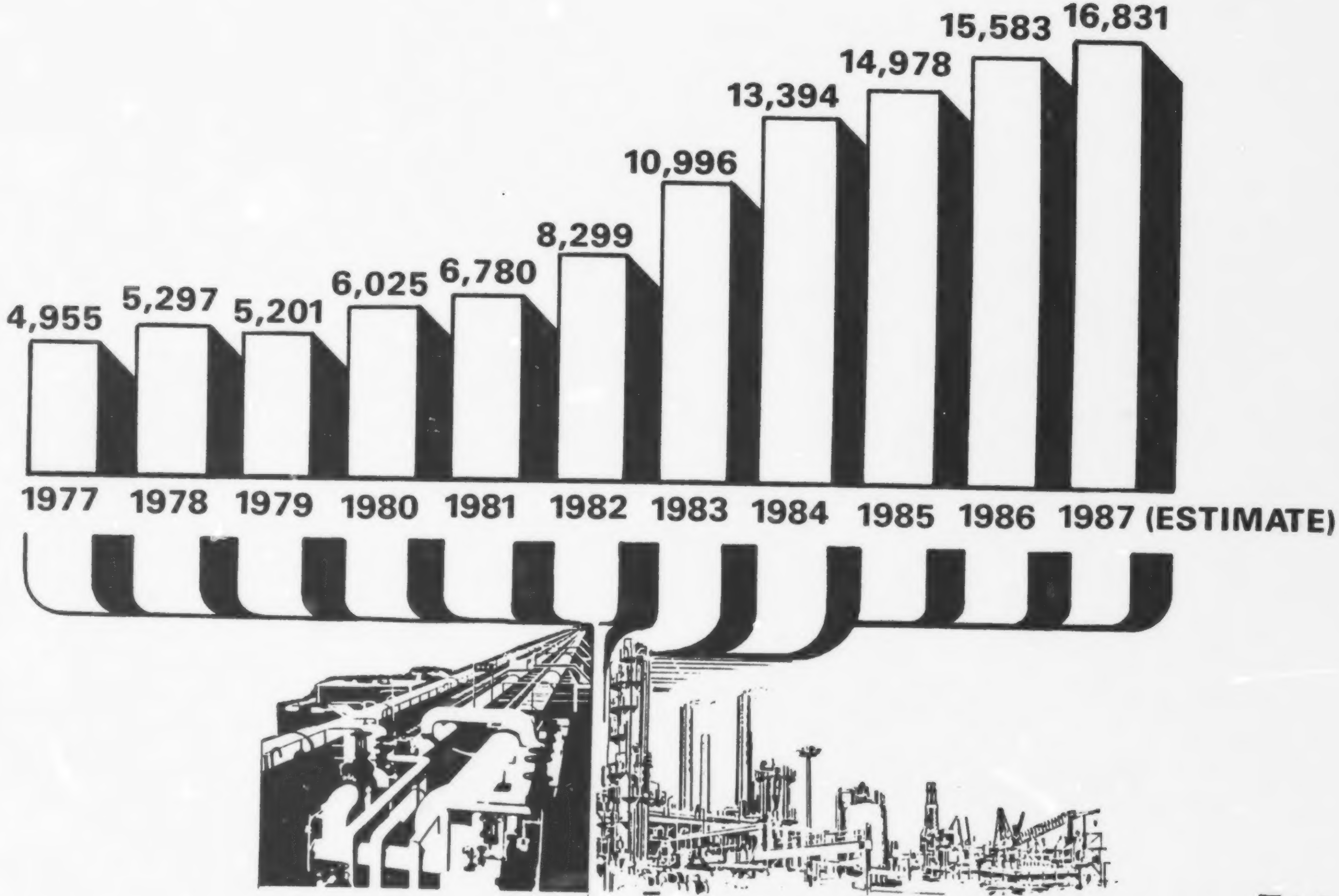


FIG 8

PETROBRÁS

EVOLUTION OF OIL CONSUMPTION AND OIL EXPENDITURES IN BRAZIL

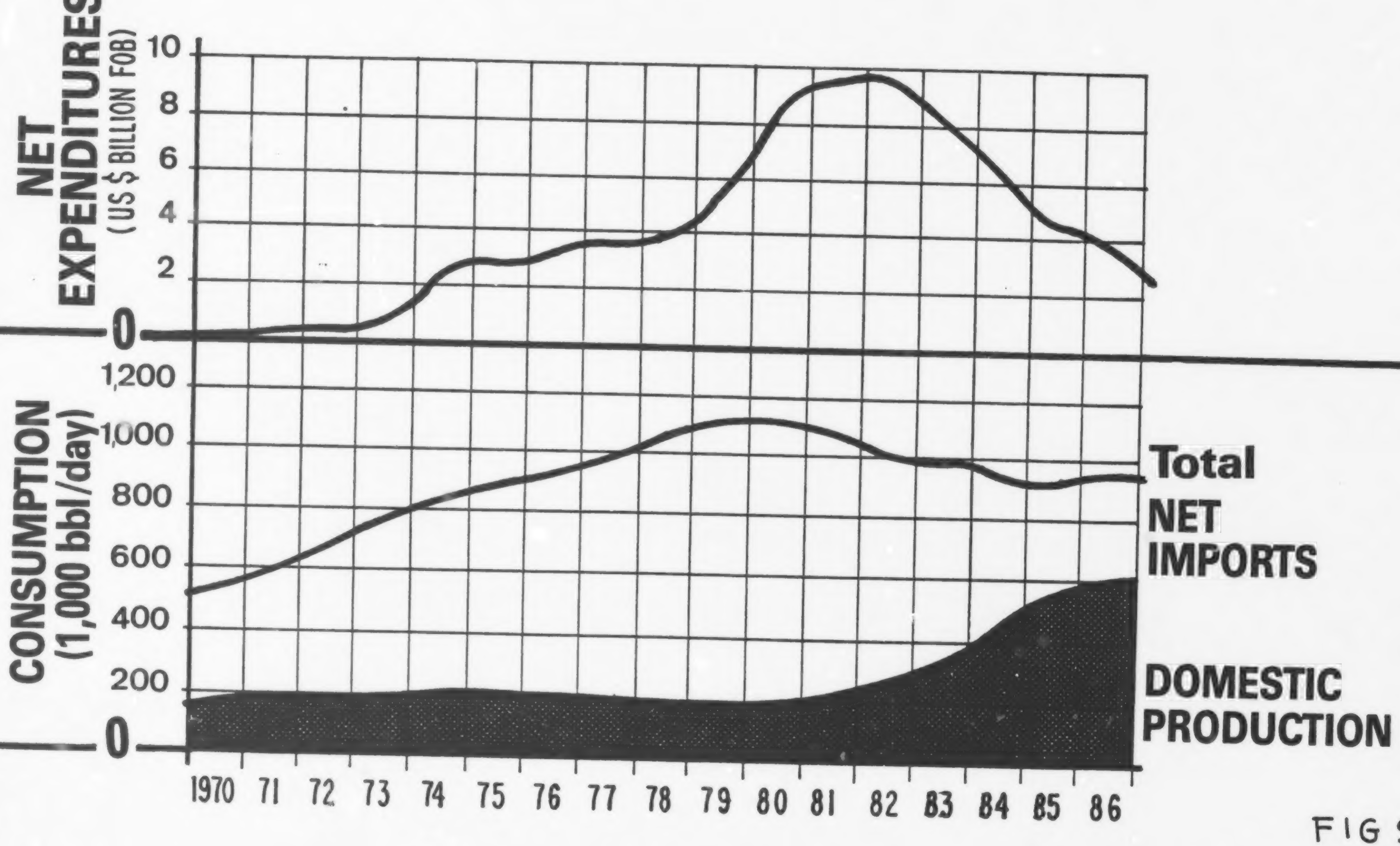


FIG 9

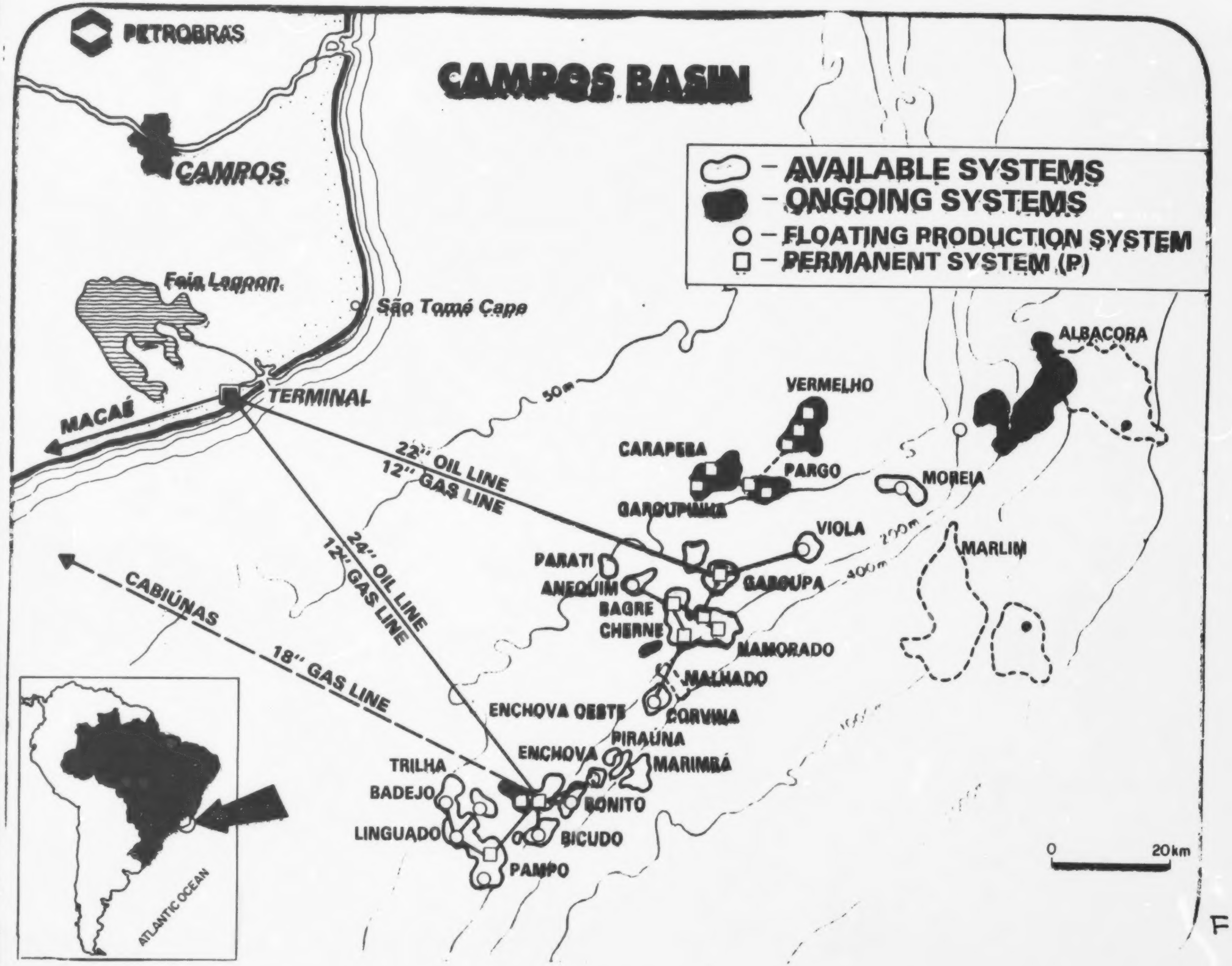

PETROBRAS
CAMPOS BASIN
CAMPOS
Feia Lagoon
São Tomé Cape
TERMINAL
MACAÉ
CABIÚNAS
18'' GAS LINE
22'' OIL LINE
12'' GAS LINE
24'' OIL LINE
12'' GAS LINE
50m
200m
400m
AVAILABLE SYSTEMS
ONGOING SYSTEMS
FLOATING PRODUCTION SYSTEM
PERMANENT SYSTEM (P)
VERMELHO
CARAPEBA
PARGO
GAROUPINHA
MOREIA
ALBACORA
MARLIM
VIOLA
PARATI
ANEQUIM
GAROUPA
BAGRE
CHERNE
NAMORADO
MALHADO
ENCHOVA OESTE
CORVINA
PIRAÚNA
MARIMBÁ
ENCHOVA
TRILHA
BADEJO
BONITO
LINGUADO
BICUDO
PAMPO
ATLANTIC OCEAN
0
20km

FIG 10

PETROBRÁS

Campos Basin

PIRAÚNA/MARIMBÁ FLOATING PRODUCTION SYSTEM

Atlantic Ocean

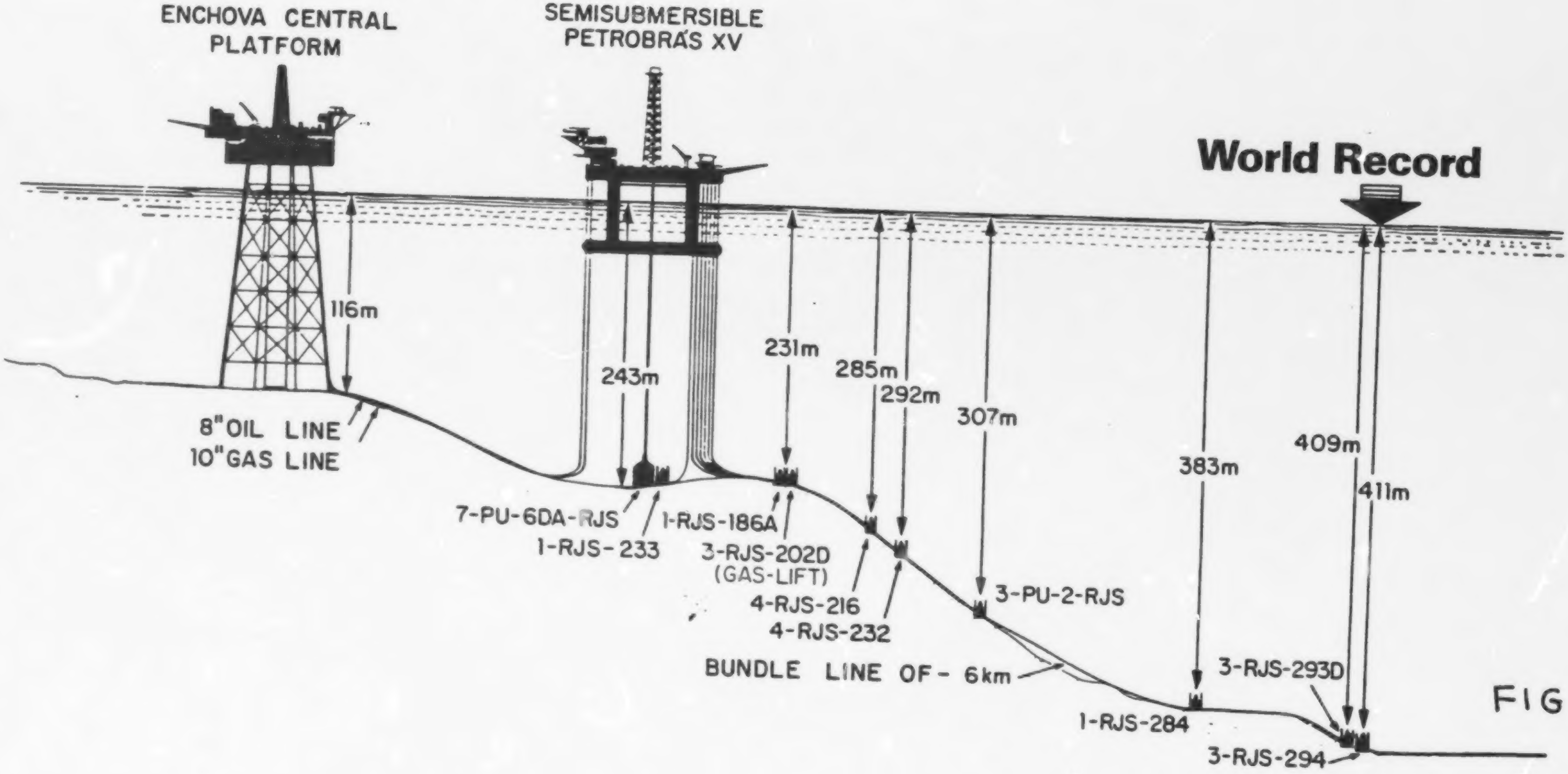
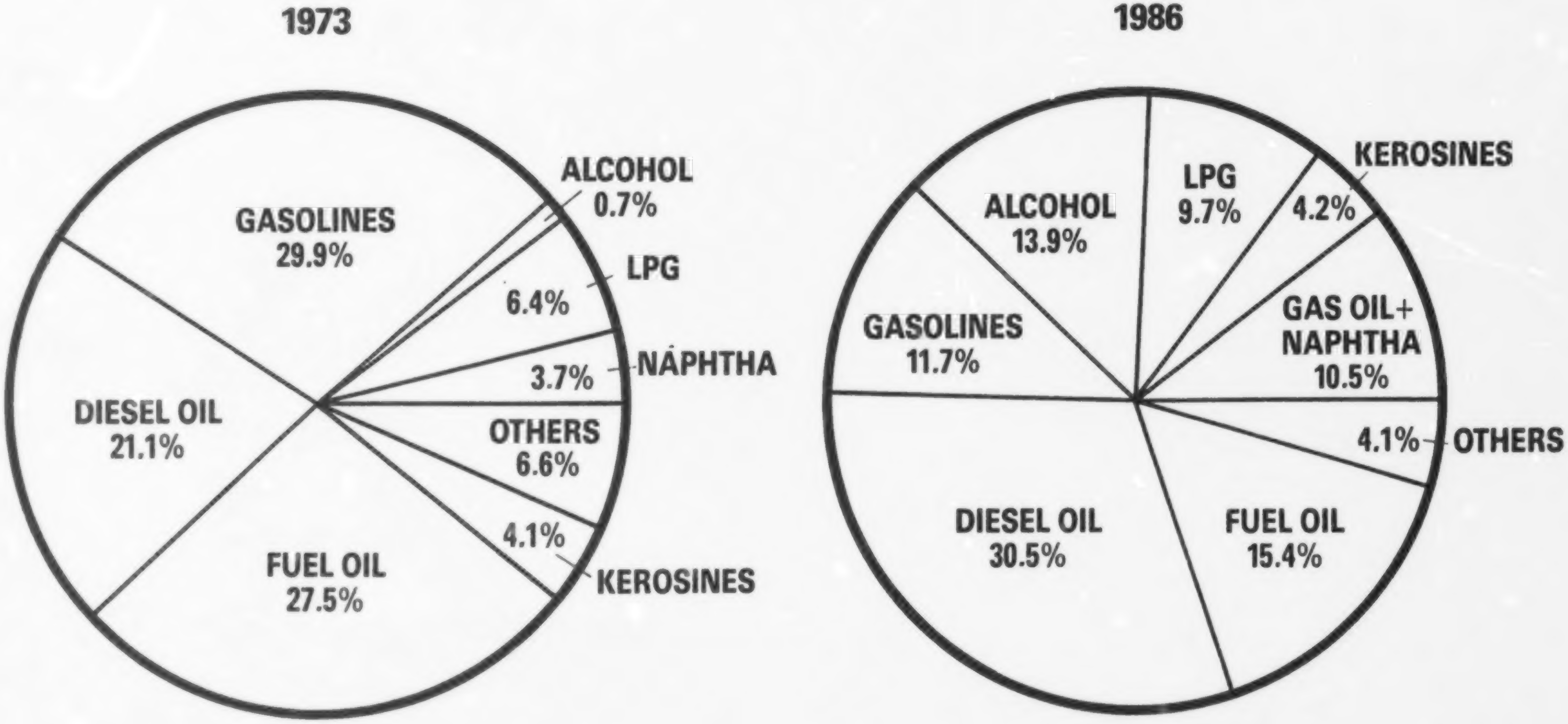

ENCHOVA CENTRAL PLATFORM
SEMISUBMERSIBLE PETROBRÁS XV
World Record
116m
243m
231m
285m
292m
307m
383m
409m
411m
8"OIL LINE
10"GAS LINE
7-PU-6DA-RJS
1-RJS-233
1-RJS-186A
3-RJS-202D (GAS-LIFT)
4-RJS-216
4-RJS-232
3-PU-2-RJS
BUNDLE LINE OF - 6km
1-RJS-284
3-RJS-293D
3-RJS-294

FIG 11

PETROBRÁS

DEMAND STRUCTURE OF OIL PRODUCTS AND ENERGY ALTERNATIVES



LPG - *Liquefied Petroleum Gas*

FIG 12

PETROBRÁS

FRONAPE
PETROBRÁS' TANKER FLEET
(Capacity and number of ships)

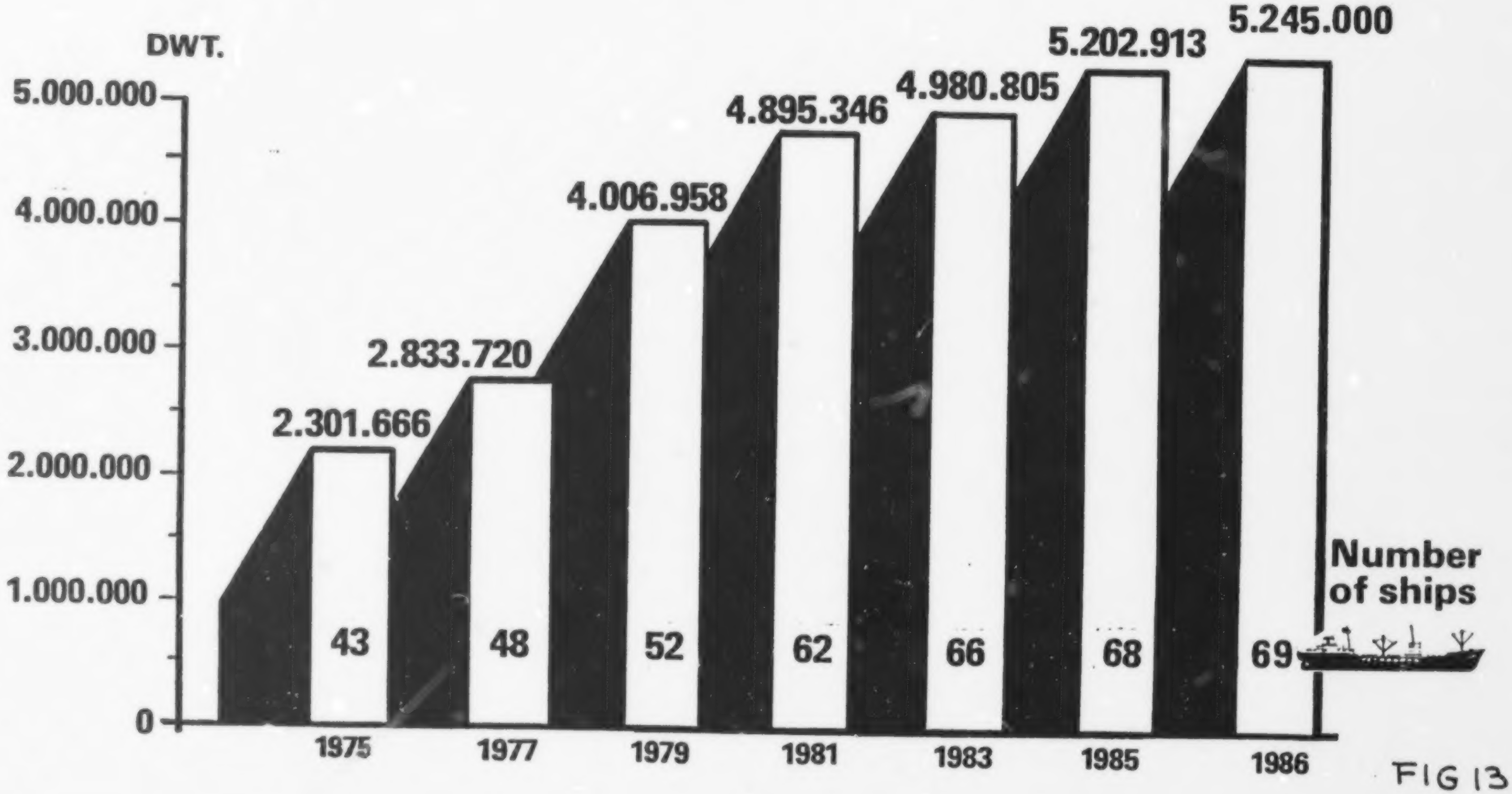


FIG 13

PETROBRÁS

EVOLUTION OF EXPORTS

PETROBRÁS GROUP AND BRAZIL

US $ BILLION

Year	Exports by PETROBRÁS (A)	Brazilian exports (B)	% Share (A/B)
1981	2.7	23.2	11.6
1982	3.2	20.2	15.8
1983	3.5	21.9	16.0
1984	4.3	27.0	15.9
1985	3.8	25.6	14.8
1986	2.5	22.4	11.2
1987	3.1(*)	23.8(**)	13.0

(*) PETROBRÁS forecast
(**) CACEX forecast
(CACEX: Foreign Trade Dept. of Banco do Brasil)

FIG 14

THE WORLD OIL MARKET:
EUROPE - CURRENT SITUATION AND MEDIUM-TERM OUTLOOK

Presented by
Ian Smart
Adviser on International Enrgy Policy Affairs
London, England

at
The Sixth Annual
International Oil and Gas Markets Conference
September 27-29, 1987
Calgary Convention Centre
Calgary, Alberta

THE WORLD OIL MARKET:
EUROPE - CURRENT SITUATION AND MEDIUM-TERM OUTLOOK

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Setting aside for a moment the extraordinary events of 1986, oil consumption in Western Europe declined from 14.9 million barrels a day (mb/d) in 1973 and 14.2 mb/d in 1976 to less than 11.9 mb/d in 1985. Over the whole period, therefore, it fell at almost twice the rate observed in North America, and by an even larger proportion than in Japan. What is more striking than totals, however, in its own right and for the purpose of comparison with other OECD regions, is the structure of West European oil demand as it has modulated over time.

Taking the OECD oil market as a whole, the notable feature of the last ten years has been the steady rise of gasoline demand, predominantly for land and air transport. Absolute demand in that sector (including jet fuels) was 10 per cent higher in 1985 than 1973, while its share of the total had grown from 31 per cent in 1976 to 38 per cent in 1985. Meanwhile, consumption of fuel oil recoiled by almost 60 per cent in the face of successive price explosions, leaving it by 1985 as less than 14 per cent of the aggregate market.

The European region has conformed to both those more general trends. Indeed, gasoline and jet fuel use expanded in 1973-85 by as much as 20 per cent. However, that swing from heavy to light products took place in Western Europe around a fulcrum whose location has throughout been different from the fulcrum of the products mix in, say, North America.

Of all petroleum products used in North America in 1986, 42 per cent consisted of gasoline and naphtha - up from 39 per cent in 1976 - 10 per cent of fuel oil, and 29 per cent of middle distillates (including jet fuel). Very clearly, the centre of gravity has remained there, throughout a decade of change, at the light end of the barrel. In Western Europe, however, gasoline and naphtha made up only 24 per cent of the 1986 total, despite strong growth in that sector during the 1970s and again from 1982. The share of those products had overtaken that of fuel oil (although not until 1983), but it still lagged well behind the 40 per cent share of the middle distillates: a share which had itself grown slowly but steadily during the previous ten years. Indeed, it is instructive to notice that Western Europe used exactly similar amounts of middle distillates and fuel oil in 1976, and that the consumption of middle distillates in 1986 was once more at that same level. By 1986, however, demand for fuel oil, like total consumption in the European region, had dropped by more than 110 million tonnes. The moral is obvious: it is in the middle of the barrel, and not at its lighter end, that the European market's centre of gravity is still to be found.

Additional absolute measurements confirm that point, and at the same time illuminate the character of the demand involved. In 1986, for example, North America used almost three times as much motor gasoline as Western Europe. However, Western Europe used more diesel oil in road transport than the whole of North America, and almost twice as much gas oil and diesel in the household, commercial and agricultural sectors. And that contrast has remained remarkably constant across the whole period since the 1973 'oil shock'.

It is exactly because the middle of the barrel is of preeminent importance to the European market that demand for its products has also proved recently to be the most volatile. When world prices began to fall so steeply in 1986, the natural reaction in North America was to use more gasoline and fuel oil. In contrast, demand for the middle distillates was almost wholly unresponsive to lower prices and, setting aside jet fuel, actually declined. In Western Europe, however, while the market held to the trend already established by taking rather more gasoline throughout 1986, it was the call for heating oil which surged dramatically in the second quarter, as feverish stockbuilding took middle distillate demand more than 20 per cent above the previous year's level and boosted total petroleum consumption by more than 11 per cent year on year. Consumption of fuel oil also showed a degree of capriciousness in Europe during 1986, falling back somewhat as the year ended after a flurry in the second and third quarters, whereas it ended the year on a high note in both North America and the Pacific. But the main lesson to be learned was that European refiners, distributors and final consumers all continue to display the greatest sensitivity in that part of the products spectrum where their regional market still has its true centre of gravity.

Volatile or apparently perverse behaviour in the oil market cannot always be explained satisfactorily by reference to prices as they are commonly advertised. In 1984, for instance, International Energy Agency (IEA) figures show that total oil deliveries in both North America and the Pacific rose for the first time since 1979, but that they actually fell slightly in Europe. West European oil consumption then expanded in 1985 (after removing distortions caused by strikes in the UK coal industry), while it stagnated or contracted in both the other OECD regions. A part of the European phenomenon was arguably due to unidentified adjustments of the temporarily disrupted balance between coal and fuel oil. But it is relevant to look also at what was happening to the value of the US dollar, as the oil price denominator, when converted into European currencies.

Expressed in US dollars, the c.i.f. prices of crude oil imported into the OECD (which serve as a sufficient proxy for all oil input prices net of tax) fell steadily from the second quarter of 1981 until mid-1983, declined more slowly from then to the end of 1985, and then plunged in 1986 before their recovery in the current year. But when those c.i.f. prices were translated into local currencies in Western Europe, the picture looked very different. Except for a short dip in early 1983, prices rose throughout the period until the second quarter of 1985. But they then began to fall steeply, as the US dollar weakened, well before the nominal price fall of 1986 arrived to accelerate that trend. And exactly the same pattern emerges from examining tax-inclusive local currency prices to final users in Europe, given a short delay for refined products to reach the market-place. In other words, prices were rising in Europe during 1984, while they declined or remained static elsewhere, but then began to fall early in 1985, mirroring and in some measure explaining the apparently perverse behaviour of the region's demand.

If one clue to volatility in the European market lies in the nervous behaviour of those who supply and use middle distillates, representing the regional barrel's centre of gravity, another clue in another connection is that Western Europe is now itself the world oil trade's centre of gravity. As a consuming region, it is, of course, responsible for the largest share of inter-area oil movements, taking more than a third of all such imports. What may be more important, however, when explaining market phenomena, is the extraordinary preponderance Western Europe has obtained as the focus of world trade in refined products. The situation would obviously be less clear-cut if it referred also to products movements inside countries such as the United States or Canada - or for that matter the Soviet Union. Internationally, however, largely because of the role played by the Amsterdam-Rotterdam-Antwerp refining complex, two-thirds of all OECD products imports and three-quarters of all products exports stood in 1986 to the West European account. The extent to which those flows stimulate and are stimulated by an active oil trading environment within the region, and thus linked to sometimes volatile price fluctuations, hardly needs to be emphasised.

OPEC's decision in 1986 to pursue market share by maximising sales volumes and shifting to netback pricing inevitably precipitated the price collapse of that summer. Equally inevitably, with nerves on edge and refining margins effectively guaranteed, the further effect was to feed natural price volatility in the European trading environment. The corollary, of course, was that OPEC's reversion to fixed prices and output quotas at the end of 1986 had something of a damping effect on price movements in Europe. The interim had been quite long and colourful enough, however, to demonstrate how pressures on European traders and consumers, born of fear or greed or both, so evidently encouraged abrupt changes of price level, starting with futures and spot-related transactions but quickly extending to all prices, as soon as discipline slackened.

In that respect, the events of 1986 recalled and underlined the lessons learned in 1979, at the time of the Iranian revolution, about the febrility of the European market-place for oil. It is entirely characteristic, therefore, that spot prices for different products in 1985-87 should have behaved so differently in Western Europe from the way they behaved in North

America. First, while both markets saw a sharp widening in late 1985 of the 'crack spread' covering prices for heavy, middle and light product prices, the peak extent of the spread was at least $2 a barrel wider in Europe. Second, spot gasoline prices in Europe diverged from prices for middle distillates in mid-1986 at a rate quite unmatched in New York Harbour. And, third, the spread which reopened between gasoline and fuel oil prices in the second quarter of 1987, after unusually strong convergence in both markets at the end of the previous year, was more than twice as wide in Europe.

A similar story emerges from looking at stockholding inclinations on the two sides of the Atlantic. At the regional level, the contrast is clear, but its extent may seem unremarkable. As between April 1986 and April 1987, for instance, the total stock level in North America moved from 94 to 95 days of forward consumption, whereas the level in Western Europe rose from 91 to 98 days. But a glance at holdings in individual national markets of particular significance reveals a more sharply drawn picture. Stocks in the United States were almost static in forward consumption terms, rising only from 95 to 96 days. Looking across Europe, however, the changes were from 68 to 78 days in France, from 101 to 89 days in Italy, and most remarkably from 93 to 120 days in Germany: in other words, both notable in size and various in direction.

Demand volatility, like price and stockholding volatility, persisted in Western Europe during the early part of the current year. In particular, the focal market for heating and diesel oils has reverted abruptly to an earlier pattern, in that the consumer stockbuilding so evident in the second quarter of 1986 has had no parallel in 1987. Instead, middle distillate demand fell in April and May, on a year-to-year basis, by almost 500,000 barrels a day. To the extent that the swing can be explained by drawing on surplus secondary and tertiary stocks built up in 1986, at lower prices, it is worth remarking that such anti-cyclical stock management is the reverse of what has been typical in the oil industry itself during recent years. In any case, the result on this occasion, despite relatively rapid growth of gasoline consumption, was that total products demand in Europe actually declined slightly over the first five months of 1987, compared with a 1.3 per cent rise in North America.

Turning to the supply side of the European oil equation, the impression is at once of greater continuity and more gradual change. Western Europe has been by far the largest regional net importer of oil throughout the post-1973 era, and shows little sign yet of losing that questionable distinction. Its net import fell from 13.3 mb/d in 1976 to 8.2 mb/d in 1986 as demand and supply both moved towards each other. Total consumption in the region shrank from 14.2 to 12.3 mb/d, while the development of North Sea oil resources raised regionally indigenous supply from 0.8 to 4.1 mb/d. However, the result was still to leave the volume of oil Western Europe apparently needs to import well ahead of the net imports in 1986 into either North America (5.0 mb/d) or Japan (4.4 mb/d).

In fact rather than appearance, Western Europe imports appreciably more oil than would be indicated by subtracting regional production from consumption. In that respect also, it differs somewhat from North America. Technical and economic considerations prompt companies in Britain, for example, to export 65 per cent of their crude output (taking 1985 figures), together with refined products equivalent to another 12 per cent of national production. Most of that goes to other countries within the European region, but rather more than 14 per cent of UK oil crosses the Atlantic. As to the European region as a whole, its gross imports in 1985 exceeded its total consumption of petroleum by more than 10 per cent and its apparent net import requirement by 70 per cent, pointing to the economic importance of exports and re-exports at that regional level as well. Detailed accounts of regional import dependence, including most official accounts, need to be read with that in mind. It is nevertheless a reasonable approximation to say that 65 per cent of the European region's oil had to be imported in 1985, of which 45 per cent came from OPEC countries and 21 per cent from OPEC producers around the Gulf alone.

Historically, the more striking fact about European supply is, of course, the expansion of production within the region itself. From next to nothing in 1973, offshore production in the North Sea and neighbouring waters has expanded to about 3.7 mb/d. Slightly under 2.7 mb/d of that total comes from the United Kingdom alone, with another 0.9 mb/d from the Norwegian sector. Thus, those two countries dominate the regional scene. In addition, however, locally significant production is now being established onshore or offshore in a growing number of other West European countries. Neither West German nor Turkish output shows signs of recovering from long decline. In the German case, for instance, the official expectation is that production will have ceased by 2000. But Denmark, the Netherlands, France and Italy are all attracting attention as small but promising oil producers, with Spain and Greece arguably waiting in the wings. For the national economies of the individual countries concerned, those are important developments. Nothing has so far appeared, however, to add more than a footnote at the regional level to the overwhelming preponderance of Britain and Norway.

What follows is that special importance now attaches to the future of British and Norwegian oil production. And the prospects in the two national cases look increasingly different. The British sector of the North Sea has been subjected to intensive exploration and development since the beginning of the 1970s, and it is now ranked officially and by the IEA as a mature oil province. Relatively substantial fields by offshore standards - fields with recoverable reserves of perhaps 250 million barrels - may well remain to be found. Indeed, at least one new field in that class has reportedly been identified within the last few months. But the prevailing wisdom is that no more giant reservoirs, on the scale of the Forties or Brent field, will be found. It is consequently to be assumed that British oil production has reached its peak. The rate and exact pattern of its decline remain to be established. Some are more optimistic than others about what geology still holds in store. Less controversially, the outcome will certainly be affected to a considerable degree by decisions yet to be taken by companies and governments, in the light of their expectations about prices, costs and taxes. Estimates by the IEA suggest that Britian will in any case still be a net oil exporter at the end of the century. But the direction of change is ostensibly settled.

The Norwegian case is otherwise. Even identified reserves would support a significantly higher rate of production, were it not that national economic strategy and, to a lesser extent, the political decision to support world prices have imposed restaints. As it is, the Norwegian government expects output from the reserves already proved to reach 1.2 mb/d by 1990.

And the probability of finding more oil in waters further north, as well as more gas, is quite high enough to justify confidence that Norway can be a larger producer in the 1990s than the 1980s. Whether it will be, of course, rests even more with economics than geology. At least, however, the option will exist. Yet the form of the Norwegian option points as much to some of the European region's future difficulties as to its opportunities. Drilling activity in Norway's offshore areas dropped sharply, if predictably, in response to the slump in world prices in 1986 - more sharply, incidentally, than in the British sector, despite the fact that dramatic cuts were made in the exploration budgets of companies engaged on both sides of the line. That in turn reflected the more difficult physical environment into which exploration is already being forced in the Norwegian case: higher latitudes, deeper water, rougher weather, and locations further from shore. And all that adds up to higher exploration costs in the short run and higher costs for producing whatever is found in the longer term, with obvious implications for investing in the light of lower or uncertain oil prices.

Even if exploration costs were not rising in all the major offshore areas of Europe, including Britain's 'frontier' waters as well, the economic prospect would be complicated increasingly by a reasonable expectation of what remains to be found. In the first place, for the reasons explained, discoveries in the British sector and southern parts of the Norwegian sector are likely on average to consist of smaller and smaller reservoirs. In the second place, the quality of what is likely to be discovered - and also of a good deal already found but awaiting development - often presents problems not typical of the fields now in production. In Britain's more northerly and westerly waters, for instance, evidence suggests that heavy crude, difficult to extract and more expensive to refine acceptably, is likely to be nearer to the norm than the sort of light, low-sulphur oil characteristic of current North Sea output. Conversely, the new reserves of liquids awaiting development in much of the central British North Sea consist increasingly of condensate associated with gas: notionally an attractive commodity, but presenting very difficult problems of project management and marketing, given the need to bring liquid and gas to market in the same time frame. And Norway faces its own troublesome version of that difficulty, in as much as extracting the oil content from fields such as Troll is crucially dependent on being able to negotiate long-term gas contracts.

The lesson to be drawn is that West European oil production confronts not only a prospect of overall decline in quantity during the 1990s, as the oldest and largest North Sea fields are depleted, but also increasing problems of location, quality and marketability. Even if world oil prices begin to rise again in real terms as the next decade unfolds, therefore, it seems almost certain that Western Europe will henceforward be driven to import a steadily growing share of its total oil requirements. The need will naturally be felt sooner and more strongly if world prices remain weak or begin to fall again in real terms. Indeed, such a contingency - another drop, say, to the equivalent of $10 or $12 a barrel, with no faith in a swift recovery - could generate pressure to shut in some of the established North Sea production capacity. That is an option to which European producers, unlike their counterparts, say, in western Texas, have hitherto had no significant resort. Nor have West European governments, hungry for tax revenue, encouraged it. But it is a policy which rising real production costs and increasingly fragile project economics could well make it progressively harder to avoid should world prices slump again in the future.

All factors, qualitative as well as quantitative, appear to be working in favour of rising European oil imports in the 1990s, whether or not world oil prices experience another fall. The continuing shift towards a lighter barrel in the balance of European product demand seems now to be exerting unfamiliar pressure in that direction, for example, since the trend will probably conflict in the future with a drift towards higher average specific gravity in Europe's indigenous crude production. There is a qualitative as well as a quantitative link, therefore, between the foreseeable evolution of the region's demand for refined products and its prospective import needs. As ever, the changing structure of demand will have to be considered in parallel with its total scale.

Although it remains important in one or two national markets, such as Italy, Portugal or Ireland, oil is undoubtedly on its way out of the West European electricity sector. In the face of competition in varying measure from coal and nuclear power - and in one or two cases such as Italy from gas as well - the share of oil supply going to generate electricity has fallen from 12.4 per cent in 1976 to 7.7 per cent in 1986. By 1995, it is expected to have shrunk further, to about 5 per cent. One contemporary effect is that Western Europe contains, and will for some time retain, a significant amount of under-employed oil-fired generating plant, forced towards premature retirement by high fuel prices or alterations of political preference. As things stand, some of that surplus capacity is available to be reactivated in response to need or economic opportunity - as happened during the UK coal strike in 1984-85, and again when fuel oil prices slumped in 1986. Looking ahead, however, it would be a mistake to adopt those recent cases as evidence of an enduring chance for oil to regain a larger share of the European electricity market. In the longer term of the 1990s, it is much more likely that rapid adjustment to unexpected circumstances will be left to a combination of gas-fired generating plant and international transfers of electricity itself.

More significantly and ominously, oil has also been losing its share of the industrial market in Europe, especially as a boiler fuel, and losing it more quickly there than in the OECD as a whole. (The industrial sector's share of total OECD oil use fell by 32 per cent between 1973 and 1985, whereas it fell in the European region by 41 per cent.) And even the crucial household and commercial sectors - crucial because the middle distillates they largely consume embrace, as we have seen, the European oil market's centre of gravity - show signs of slipping away from their petroleum allegiance. Oil demand there has fallen to considerably less than 70 per cent of its 1973 level already, and the expectation must be that, as with industrial use, it will fall further during the next few years under persistent pressure from both gas and non-oil-based electricity.

Transport is the one sector where the market for oil in Europe has grown consistently, from 27 per cent of total oil consumption in 1976 to 41 per cent in 1986. All the indications are that growth of that sort will continue into the 1990s. The region's taste for middle distillates will nevertheless remain apparent, in as much as the use of diesel fuel on European roads seems set once more to expand. Overall, however, the inexorable advance of the transport sector will still be mirrored in the steady shift, around that fulcrum, towards the lighter end of the barrel. And that will merely underline the West European oil market's pursuit into the longer term of what may reasonably be described as the North American model.

The final conclusion, looking towards the medium term of the 1990s as well as towards more distant horizons, cannot be stressed too strongly. That medium-term future, and even more the long term towards the end of the century, will be shaped by the interaction of two main factors: on the one hand, the evolution of world oil prices, and its impact on Europe's indigenous development of oil resources; on the other hand, the rate at which social change and interfuel substitution alter the qualitative pattern of regional oil demand. Those are not, of course, the only considerations. Before the end of the next decade, concern about the environmental effects of burning hydrocarbons is likely to play a larger role in the market-place as well as the debating chamber. And governments at every stage will still want to bring their fears about international security into the oil market. In the long-run, the imperatives of price and social preference will nevertheless commonly prevail. And they alone are enough to paint a worrying picture of the future.

Especially if real world prices fail to revive, it seems certain in any case that West European buyers will be increasing their call on the world oil market in the 1990s, as regional production falls further away from the level of demand. The IEA, working with national government projections, estimates that its European members will need 1 mb/d more of net imports in 1995 than in 1985. That should probably be regarded as a conservative minimum. But the more serious and worrying consideration emerging from the argument presented here is that Europeans are likely in the event to be re-entering the market not only as more eager bidders for OPEC and other Third World crude in general, but also as consumers of a refined product slate which will by then be less complementary to its North American analogue than was true fifteen years ago. Instead, it will be more directly, more expensively, and possibly more abrasively competitive.

CHINA--CURRENT SITUATION AND OUTLOOK

Presented by
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at
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Just before the end of 1978, two years after Mao Tse Tung's death, China set out on an uncharted round of reformist policies favoured by Deng Xiaoping. Ever since that time there has been no shortage of exciting news coming from the country attempting to shift a fifth of humanity from an overwhelmingly subsistent farming state to the doorstep of modernity. Perhaps most notably, average per capita food availability in China is now within 10 percent of the Japanese mean, life expenctancy is just a few years behind the rich countries' level and economic growth has been matching the best Japanese-South Korean rates.

Although the expectation a decade ago indicated that the oil and gas sector will be very much a part of these rapid, stunning changes the realities have been much less exciting. While electricity generation in 1986 was 75 percent above the 1978 total and coal output 40 percent--crude oil extraction was just 26 percent higher and natural gas output showed no increase in all! Lackluster performance of oil and gas industry in the midst of rapid economic growth shows no real improvements.

Statistics for the first half of 1987 indicate a completion of nearly 2200 new wells with 960 more to follow before the end of the year, adding altogether about three percent to the 1986 extraction; no increase at all is foreseen for natural gas output. Not surprisingly, crude and product exports in 1987 are to be kept at the 1986 level, that is no more than 670,000 b/d (34.6 million t), a ten percent decline compared to the 1985 peak of nearly 740,000 b/d (30.4 million t).

If this is all rather unexciting the latest discoveries and new field developments have not been stunning either. Daqing oilfield, contrary to repeated predictions of substantial decline, comes up every year with a bit more extraction, now chiefly on its margin, to continue as the unchallenged leading producer, with 55 million t accounting this year for at least 42 percent of the total crude flow. Shengli, with 28 million t remains second (21 percent share), Liaohe with 11.4 million t expected this year is now third with nearly 9 percent of all crude. These three fields thus deliver nearly 3/4 of all Chinese crude and the top six (adding Zhongyuan, Huabei and Dagang) produce 89 percent and by 1990 they should extract 92.5 percent: concentration of production in established fields is thus actually stengthening.

Offshore contribution looks decidely unimpressive: 1986 total was just 375,000 t of crude, or less than 0.3 percent of total extraction. The flow was divided among the Japanese-developed Chengbei oilfield of Bohaiwan (168,000 t), Weizhou field in the South China Sea (160,000 t) and the No. 8 oil rig at Bohai (47,000 t). Both the Chengbei and the Weizhou operation are expected to go up to 300,000 t this year, raising the offshore production share to half a percent. Japanese and French will take the exports.

Discoveries announced so far this year are very much in the minor league of the recent past. Most notable are Wei 6-1-1 well with 944,000 m^3 of gas, 1320 b/d condensate and 1484 b/d crude in the South, and a Liaodong Wan, a part of Liuzhou field in Bohai in the north with 93750 m^3 gas/d and 4603 b/d of crude. In the gas development the only living story is the repeated assurance that on July 1, 1989 3.25 billion m^3/year will start flowing from the Nankai to Nanzhan in Hainan and from there to Guangzhou and Shenzhen (Alcoa-Santa Fe development). Foreign participation in the onshore exploration has changed little from the day when Wang Tao complained in Hong Kong that 50 companies came to negotiate but only one remained: one or two more are now gingerly in.

Is there at least more excitement ahead? The official crude oil production goal is for 150 million t (2.87 mbd) by 1990, a growth rate of 4.5 percent a year. But whatever happens to the global oil demand in the years ahead these small Chinese additions will not enlarge the world oil market. While there is no danger--or hope?--of Chinese turning into crude importers during the remainder of this century there is also only a negligible probability of substantially increased Chinese oil exports.

Oil is still the country's largest export earner--this year it will bring about US $4.1 billion-- and the Chinese, recently struggling with what they perceive as unacceptable trade deficits, will want to retain this multibillion asset but the pressures of the domestic requirements have been rising in so many ways--predictable and unpredictable--that any sizeable boost of exports could come only at a price of perpetuating the existing domestic supply shortages or further aggravation of various pent-up demands.

Four different sectors have been putting the greatest strain on the country's hydrocarbon supply: heavy industry, rural manufactures, transportation, and urban households and services. Post-1978 reforms have changed many things in China but not the Stalinist infatuation with heavy industry. True, the share of the industry in the nationwide gross output value is now, at about 39 percent, slightly lower than the late 1970s peak of over 41 percent--but still ahead of the light manufactures (about 35 percent) and still growing very rapidly (up 9.6 percent in 1986).

This would be much more bearable if the energy intensity of China's industrial production would be more like Japan's, the world's most efficient user of fuels. Unfortunately, China is at the opposite end: no other country in the world is such a wasteful user of primary energy. Difficulties in converting the really unconvertible Chinese currency make international comparisons of energy intensities of GNP rather tricky but there is no doubt that no other country than China consumes more energy per unit of GNP. In no small part this owes to extraordinarily small share of inherently more efficient hydrocarbons. For example, hydrocarbons account for less than four percent of all energy inputs in Chinese iron and steel industry, an order of magnitude below the Japanese level. The pressure on hydrocarbon supply is thus twofold: what is used is converted inefficiently but too little is used to make the whole economy more efficient.

Rural manufactures, ranging from sewing subcontracted clothes by Hong Kong companies to making of farming implements, have literally exploded around China with recent annual growth rates on the order of 20 percent and the total 1981-86 fourfold use! These enterprises have been overwhelmingly energized by coal but tens of thousands of them would prefer liquid fuels if they could get them and thousands of them are buying refined products on the limited free market with their bulging profits.

Transportation in China is in general grossly inadequate and horribly overburdened. The first reality is best illustrated by noting that in terms of railway km/km^2 of the densely inhabited territory

China now is at the same level as the US were in the 1870s. The other is best experienced by riding a Chinese city bus during a rushhour or trying to buy a rail ticket to a popular scenic spot. Airlines links also need much expansion, in spite of recent performance increases as high as 23 percent a year.

After three decades of no relative growth and, periodically, of considerable decline, Chinese cities started to expand again after 1978. In 1960 urban population was 11.9 percent of the total, in 1970 only 8 percent and the same percentage remained up to 1978. Since 1978 161 new cities were incorporated, the number of cities with more than one million people rose from 13 to 23. New administrative division make direct comparisons difficult but the city dwellers and the relatively affluent suburban peasants living within city boundaries are now nearly a quarter of Chinese population. Needless to say, they have the highest purchasing power and they want to own mopeds and motorbikes and cook with bottled gas.

Certainly the most obvious case of huge pent-up demand for refined products is the potential private car ownership. Today there are some 3.6 million passenger cars in China (the total including jeeps copied from the Soviets who copied it from the real thing--since 1986 there is a genuine jeep manufacturing line in Beijing but its output is destined overwhelmingly for export), or one for every 300 people--but almost all of them belong to danwei (labor units) and the army.

Only 16,000 people own their cars (or one for every 66,000 Chinese) and only about 20,000 new cars are made per year. This is, of course, a reflection of extraordinarily high costs of car ownership. This year average urban family income will be about Rmb 900 but a new car costs at least Rmb 9,000-11,000--and in the capital a new driver must pay a tuition of Rmb 1,800 for three months of driving classes.

But ever since the rural reforms made many suburban farmers rich or, by Chinese standards, super-rich, there are tens of thousands of families for whom an investment of Rmb 10,000 is no big obstacle. In fact, according to a 1987 Chinese report a conservative estimate of currently unsatisfied demand is at least 100,000 cars a year! That is still two orders of magnitude below North American sales but a decision to tap that market through higher domestic car output (First Automobile Works in Changchun made a fairly big deal with Chrysler this summer to mass produce engines) would result in a rapid growth of gasoline demand.

It is likely to happen? Certainly it appears highly improbable today--but hardly more improbable than the thought of 100,000 potential private car buyers a year would have appeared a decade ago, year before the first formulation of economic reforms when the incomes were barely enough to buy the rationed food.

In any case, the next five years are unlikely to see any large shifts in any segment of China's oil and gas industry. Production will be around 3 mbd (3.3 is the extreme), exports will not go over 25-30 percent of this total and may not be even as large as those of 1986-1987, and domestic supply shortages will continue. China will remain what she is: an important oil producer in absolute terms but a minor force in the world oil market.

THE EFFECTS OF THE NOVEMBER 1986 DEREGULATION OF THE CANADIAN GAS INDUSTRY

"THE PRODUCERS' PERSPECTIVE"

Presented by

D. Michael G. Stewart

Vice-President
Corporate Development & Marketing

Canterra Energy Ltd.
Calgary, Alberta, Canada

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(Slide 1)

Good afternoon, ladies and gentlemen.

At the 1986 Conference session on Canadian Gas Market Deregulation, two perspectives were examined - the producers' and the distributors'. The producers' perspective was presented by Mr. Doug Stoneman of Shell Canada. Doug provided a statement of principles for gas market deregulation supported by the Canadian Petroleum Association, a status report on developments to date, and a review of the CPA's position on issues yet to be resolved.

While some obstacles and unresolved issues still remain, deregulation is, for the most part, complete. These past eleven months have caused us to certainly recognize that many perspectives exist in a deregulated market between producers, consumers, competitors, regulators and governments. This is evidenced by the doubling of the participants on this panel from last year, and I expect the platform could be extremely crowded for this session at next year's conference if the next 12 months are as eventful and full of change as last year.

(Slide 2)

As opposed to Mr. Stoneman's paper of last year, which presented an industry view, I would like to provide more of a producer's perspective on deregulation. The emphasis here is on the singular possessive. In addition to touching on the macro issues, I'm also going to try to provide some insight on how business at Canterra has changed with gas market deregulation. While I don't feel it is possible to present one perspective for all producers, since there are likely as many perspectives as there are producers, I do believe that many of our experiences and views on gas market deregulation are common to a number of other Canadian producers.

(Slide 3)

My talk today will provide Canterra's perspective on gas market deregulation by addressing a few basic questions:

- Have gas markets, and our understanding of these markets, changed?
- How has deregulation affected our day-to-day operations, long term strategic planning and sales results;

And, finally,

- How do we view our competitors, and how does the role of government affect our business?

My comments, for the most part, pertain to Alberta gas as that is where the bulk of Canterra's reserves and production are located, and given that Alberta provides the bulk of Canada's natural gas supply.

(Slide 4)

Prior to deregulation, there were few marketing options available for Canadian natural gas producers.

(Slide 5)

The transaction flows in the gas trade were straight forward. A limited number of parties were involved in the intermediate stages, with the transaction flow and physical flow of gas integrated and following the same route.

In the past, producers dealt largely with pipelines in selling their gas, as is still evidenced by the fact today that most producers have the bulk of their gas reserves committed under long term contract to what we refer to as traditional pipeline buyers. At Canterra, that number approaches 80% of our proved reserves.

(Slide 6)

In the deregulated market structure that has developed in North America, the physical gas flow is unchanged from the regulated environment. What has changed is that there is a proliferation of transaction options now available to producers with both established and new market players.

Deregulation has also brought about a separation of the merchandising and transportation functions of pipelines.

As you are well aware, there is a growing interest on the part of distributors and end users to contract directly with producers for gas supply.

This transition from an oligopolistic to a more competitive market structure has resulted in short term problems and market fragmentation, primarily to the detriment of the producing industry. It is Canterra's belief, however, that over the longer term, deregulation will benefit both producers and consumers.

(Slide 7)

Prior to deregulation, the Alberta field netback price for gas sales was essentially the same, regardless of the purchaser or end market. This was the product of regulated prices for

Alberta and export sales, as well as an export flowback mechanism which distributed additional revenues from export sales among all Alberta producers, irrespective of their sales arrangements.

The shortcomings of this type of pricing mechanism became more obvious over time - a lack of responsiveness to end use market competitive factors, and a failure of this mechanism to provide producers with the incentive or signals to seek out the highest value market for their gas.

With deregulation, there are literally as many different pricing mechanisms and price netbacks as there are sales agreements. Netbacks vary with purchaser, target market, load factor, contract terms and duration. As an example, during August of 1987, Canterra's wellhead prices varied between 90¢ and $2.10 per million BTU.

(Slide 8)

Before deregulation, there was very little motivation, and perhaps need, for Canterra to understand the markets in which our gas was ultimately consumed. Our principal job was to find and develop gas reserves. The marketing function was essentially a contract administration function and, for the most part, involved inventorying reserves until one of the few purchasers tendered for additional supplies.

With the exception of intra-Alberta gas sales, wellhead netbacks were essentially the same. Forecasting gas prices required stronger instincts as a political scientist than as an economic or market analyst.

Deregulation has, however, necessitated the development of a greater understanding of gas markets. This knowledge does not come easily and is key to identifying:

- those markets that will provide the highest-price netbacks;
- potential purchasers and what their requirements are, and the key economic factors affecting their business and their gas consumption.

We also need to assess:

- competing fuels in different markets and what will drive prices in the future;
- and last, but by no means least, regulatory requirements and obstacles that can slow or impede sales efforts.

While we are still a long way from a complete understanding of gas markets at Canterra, we are starting to put order to a complex matrix of facts and, at times, fiction, and are moving up the learning curve in our market development efforts.

(Slide 9)

The impact of deregulation on producers' cash flow is not entirely obvious. While regulated pricing somewhat insulated producers from market vagaries, there is no doubt that regulated prices would have had to decline given the supply surplus in North America and lower prices for competing fuels. Over the longer term, we believe Canterra will benefit from higher prices and sales volumes as a result of gas market deregulation. The proviso here, of course, is that governments don't step in and re-regulate as supplies tighten and prices rise, as we project may occur in the latter part of this decade. In the near term, there is no doubt that producers' cash flow will suffer with deregulation.

(Slide 10)

As I'm sure all of you know, producer netbacks have declined since November 1986, but as this figure illustrates, gas prices were already starting to erode prior to deregulation. This is due to the fact that only about 30% of Alberta gas production is sold into the so-called "core" residential and commercial markets. Some 70% is sold into the competitive U.S. export market and industrial markets in Alberta and Eastern Canada where regulated gas prices had to respond to market forces well before November 1986.

Deregulation of export gas prices began as far back as July 1983 with the introduction of the Volume-Related Incentive Price Program.

Alberta industrial sales have never been regulated and special marketing programs, incentives and allowances foreshadowed deregulation of industrial gas sales in Eastern Canada.

(Slide 11)

This slide illustrates the trends in gas sales in Eastern Canadian and export markets.

Prior to 1986, TransCanada PipeLines had about 95% of the Eastern Canadian market. Direct sales into this market commenced early in 1986 and TransCanada's market share has since declined to less than 90% and is still falling. While Canadian gas sales in total are beginning to recover, in part due to lower competitive gas prices, an increasing proportion is being made up from direct purchases from producers.

Canterra forecasts exports to the U.S. could reach 900 Bcf in 1987, up from 740 Bcf in 1986. Without market-sensitive pricing, Canadian gas exports could easily have fallen to the 500 Bcf range and created a much more difficult medium-term marketing problem for Western Canadian producers.

(Slide 12)

Canterra's gas marketing operations have changed considerably over the last three years. Our gas marketing staff has grown from three to seven employees on a full-time basis. Prior to deregulation, the day-to-day activities centered on contract administration and supply scheduling. While these responsibilities still remain, our marketing group is now also aggressively pursuing new gas sales from existing and future uncommitted reserves. Currently, over 10% of Canterra's gas sales are made directly with end users and this proportion is expected to steadily increase in the future.

Delivery of gas downstream of the plant gate, commonplace under many direct sales arrangements, requires significant additional work on the part of a producer. Arranging for transportation on one or more pipeline systems, obtaining the required regulatory approvals, and day-to-day supply management were all tasks previously handled by our traditional purchasers, and which now must be handled by producers engaged in direct marketing.

Another complication results from the way in which the oil and gas industry does its business - through joint ventures. We are finding that in provisions related to marketing, the traditional land and unit agreement procedures are inadequate in the new deregulated environment. In the past, operators were often relied upon to market gas for the other working interest owners. In today's environment, each owner should assume responsibility for marketing their share of production, or, if an owner is unable to find a market, then they should be prepared to pay some compensation for another party providing a market outlet.

Marketing costs money - the operator, or any other partner who undertakes the marketing responsibility cited above, should be reimbursed for the costs incurred. At Canterra, we feel that working interest parties have an obligation to either elect to take their share of production in kind, or commit to a marketing agreement with the operator, or other partners, with access to a market.

An alternative to this approach is the so-called gas balancing agreement. Our experience with these types of agreements is that they are extremely complicated to put in place on an equitable basis and should only be used as a last resort.

(Slide 13)

Deregulation has provided numerous options for marketing gas production.

Previously, an Alberta producer's marketing strategy was fairly simple - contract to a pipeline buyer with excess volumes either sold in the Alberta industrial market or shut-in for sale at a later date. Numerous marketing options now exist and producers are faced with continually evaluating and balancing between maximization of long-term asset value and short-term cash flow requirements.

Both short-term and long-term contract sales opportunities exist in addition to spot sales. Producers can choose between domestic or export markets, and whether prices are renegotiated on a regular basis or fixed and increased through the use of price indices.

Broader strategic issues must also be considered; such as, direct gas marketing versus the use of intermediaries. Given the uncertainty involved and the large reserves position we have, Canterra has taken the decision that, in the future, we will position ourselves to market all of our new gas supplies directly.

In the past, exploration and production were considered line functions while marketing played a service role. With deregulation, a company's marketing strategy has become more important and the marketing function has been elevated accordingly. Whereas previously we viewed Canterra as an E & P company, we now consider that there are three functional components to our core business - exploration, production and marketing.

(Slide 14)

I believe there are four key ingredients necessary to successfully market gas - reserves; transportation; marketing expertise; and regulatory approvals. Canterra, and several other companies represented in this room, have the reserves, and over time transportation will become more available, despite the pipelines' efforts to withhold it.

Marketing knowledge is coming with experience and hard work.

Regulatory approvals, however, are still a problem. The delay in the issuance of gas removal permits by the Alberta government, in the absence of explicit policy guidelines, is frustrating for marketers and, hopefully, will be resolved in the near term. The recent decision by the National Energy Board to adopt a Market-Based procedure for determining exportable surpluses will, in the longer term, be of benefit to the producing industry in securing long term export sales.

The last three ingredients shown on this slide have necessitated finding people with these new skills sets. We have had to develop the expertise internally since an adequate labour pool with the required skills did not exist in Calgary. We expect the market for these types of individuals will remain tight for some time as more and more companies start-up and expand marketing departments.

(Slide 15)

Canterra's relative success as an E & P Company has always been affected by the exploration and production activities and results of our competitors. With deregulation, marketing is also an important factor in how we operate and measure ourselves against industry. Deregulation has also changed who we view as our competitors. Traditionally, this included companies active in upstream operations. Now, any company or individual involved in marketing gas is also viewed as a competitor.

(Slide 16)

The government's participation in pricing natural gas for domestic and export sales has changed from a major role to a minor role. It hasn't completely disappeared, however, which makes me nervous as a producer and marketer. It's easy for government to deregulate in a falling price environment. It will take considerably more courage and political will to resist re-regulation when gas prices increase, since energy consumers outnumber energy producers when it comes to votes.

We have observed a strong, positive correlation between the rate of change in energy prices and the rate of change in government policy.

(Slide 17)

The vertical lines on this slide show the dates of major Canadian oil and gas policy changes since 1960 against the movement of world oil prices over the same period.

One can draw several conclusions from this illustration.

When world oil prices have been stable, so has Canadian oil and gas policy. In contrast, when world prices have been unstable, so has Canadian oil and gas policy. In periods characterized by large price changes, both up and down, the rules which govern the petroleum industry have changed frequently.

I have a concern, which I hope is unwarranted, that we would see a similar pattern of government intervention emerge if gas prices escalated rapidly in this deregulated market that we now have.

(Slide 18)

The industry, and Canterra, have come a long way since Canadian gas markets were deregulated in November 1986. We are pleased the Alberta and other governments in Canada support the concept and continue to work towards its full implementation. At Canterra, we believe unrestricted trade in natural gas will benefit our Company, the producing industry, our customers, and Canadians.

. . . . .

I thank you for your attention and the opportunity to participate in this section of the program.

Canterra

THE EFFECTS OF THE NOVEMBER 1986 DEREGULATION OF THE CANADIAN GAS INDUSTRY

"THE PRODUCERS' PERSPECTIVE"

Canterra

THE EFFECTS OF THE NOVEMBER 1986 DEREGULATION OF THE CANADIAN GAS INDUSTRY

"A PRODUCER'S PERSPECTIVE"

Canterra

A PRODUCER'S PERSPECTIVE

- MARKETS
- MARKETING RESULTS AND ACTIVITIES
- EXTERNAL FACTORS
    - COMPETITORS
    - GOVERNMENT ROLE

Canterra

A PRODUCER'S PERSPECTIVE

MARKETS

	BEFORE DEREGULATION	NOW
MARKETING OPTIONS	FEW	MANY

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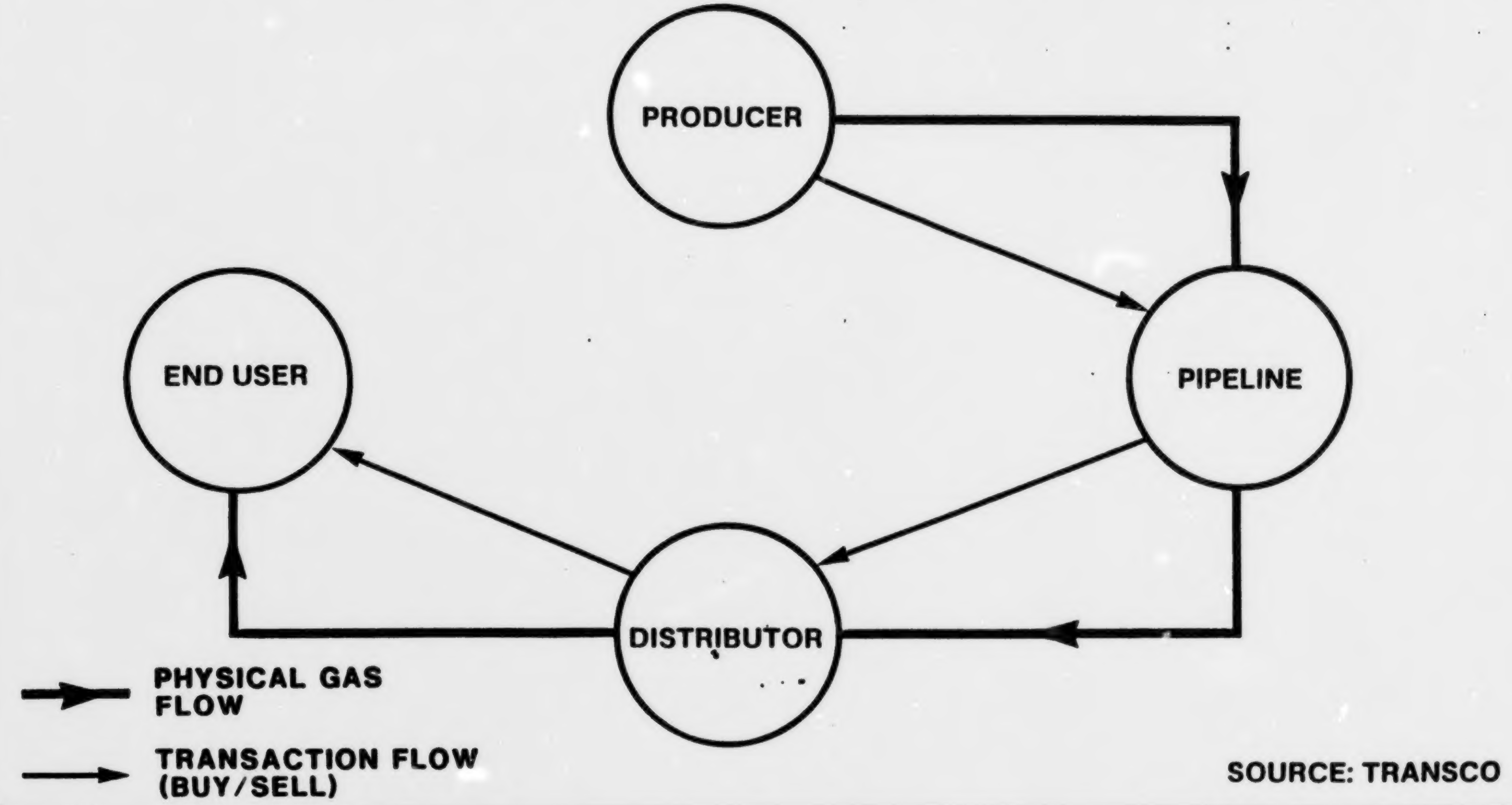
NATURAL GAS INDUSTRY
TRADITIONAL BUSINESS STRUCTURE



PRODUCER
PIPELINE
END USER
DISTRIBUTOR

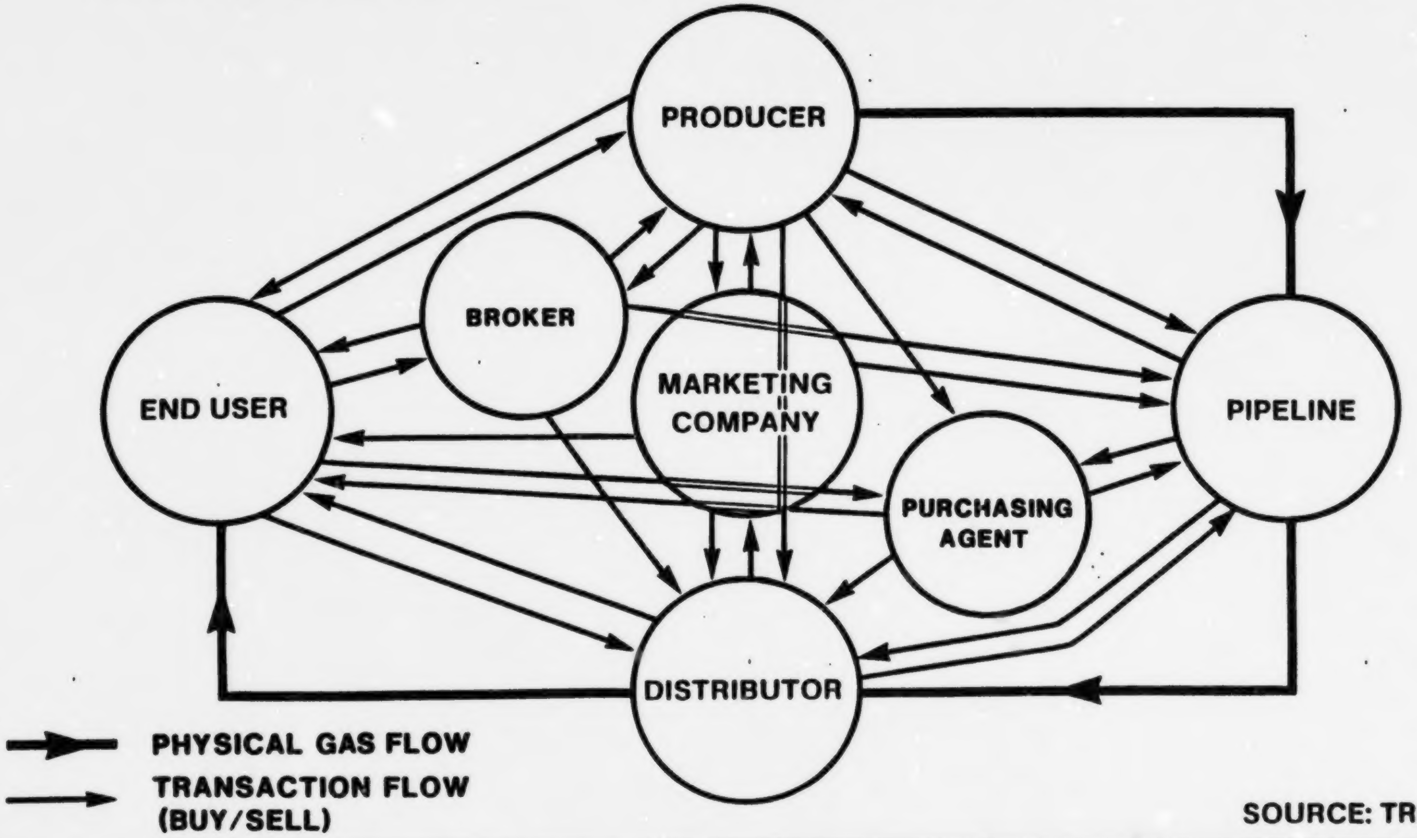
PHYSICAL GAS FLOW

TRANSACTION FLOW (BUY/SELL)

SOURCE: TRANSCO

Canterra

NATURAL GAS INDUSTRY
DEREGULATED BUSINESS STRUCTURE


PRODUCER
BROKER
END USER
MARKETING COMPANY
PIPELINE
PURCHASING AGENT
DISTRIBUTOR
PHYSICAL GAS FLOW
TRANSACTION FLOW (BUY/SELL)

SOURCE: TRANSCO

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A PRODUCER'S PERSPECTIVE
MARKETS

	BEFORE DEREGULATION	NOW
MARKETING OPTIONS	FEW	MANY
PRICING MECHANISMS	REGULATED	MANY

Canterra

A PRODUCER'S PERSPECTIVE

MARKETS

	BEFORE DEREGULATION	NOW
MARKETING OPTIONS	FEW	MANY
PRICING MECHANISMS	REGULATED	MANY
MARKET UNDERSTANDING	POOR	IMPROVING

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A PRODUCER'S PERSPECTIVE

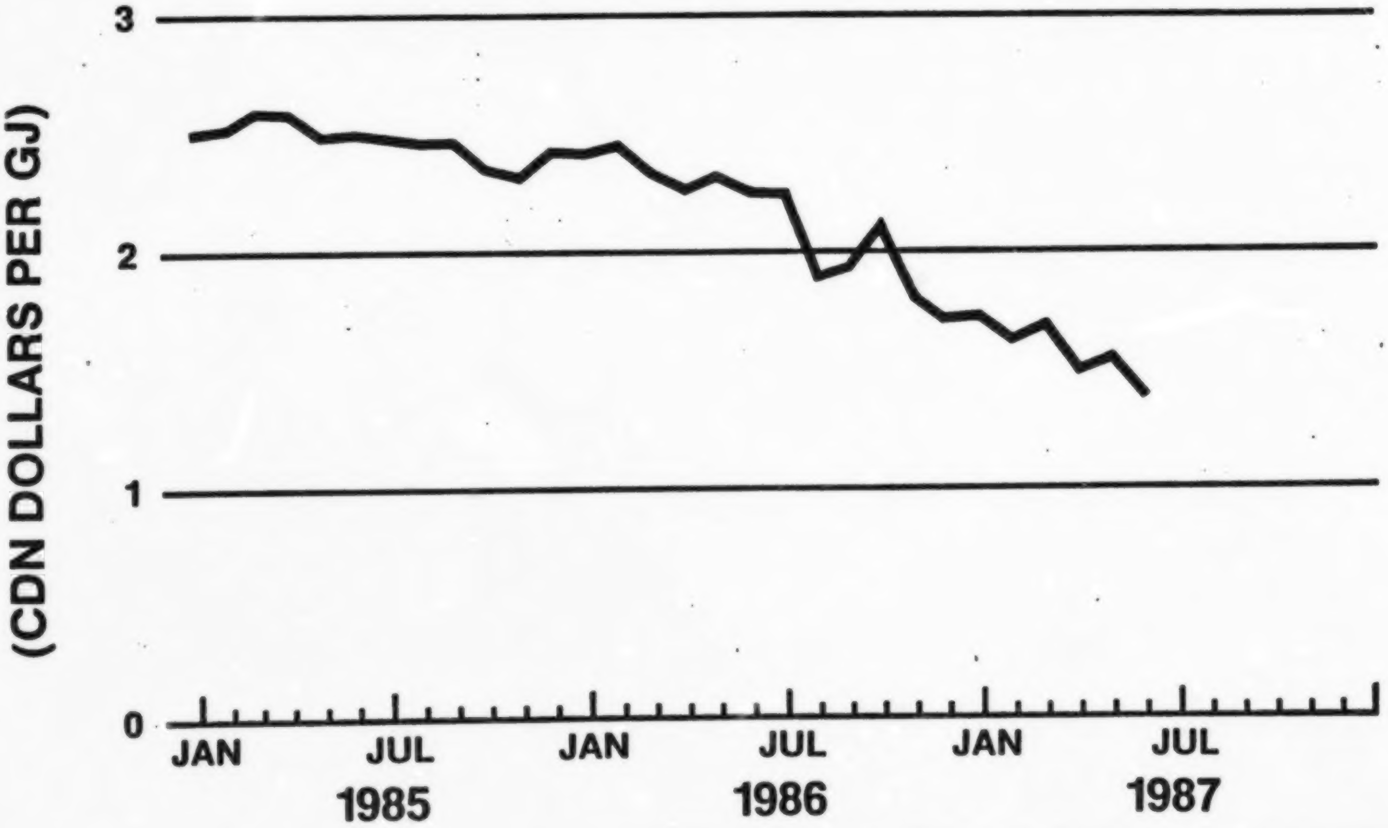
MARKETING RESULTS AND ACTIVITIES

	BEFORE DEREGULATION	NOW
CASH FLOW	INSULATED	NEGATIVE IN SHORT TERM

Canterra

NATURAL GAS PRICE

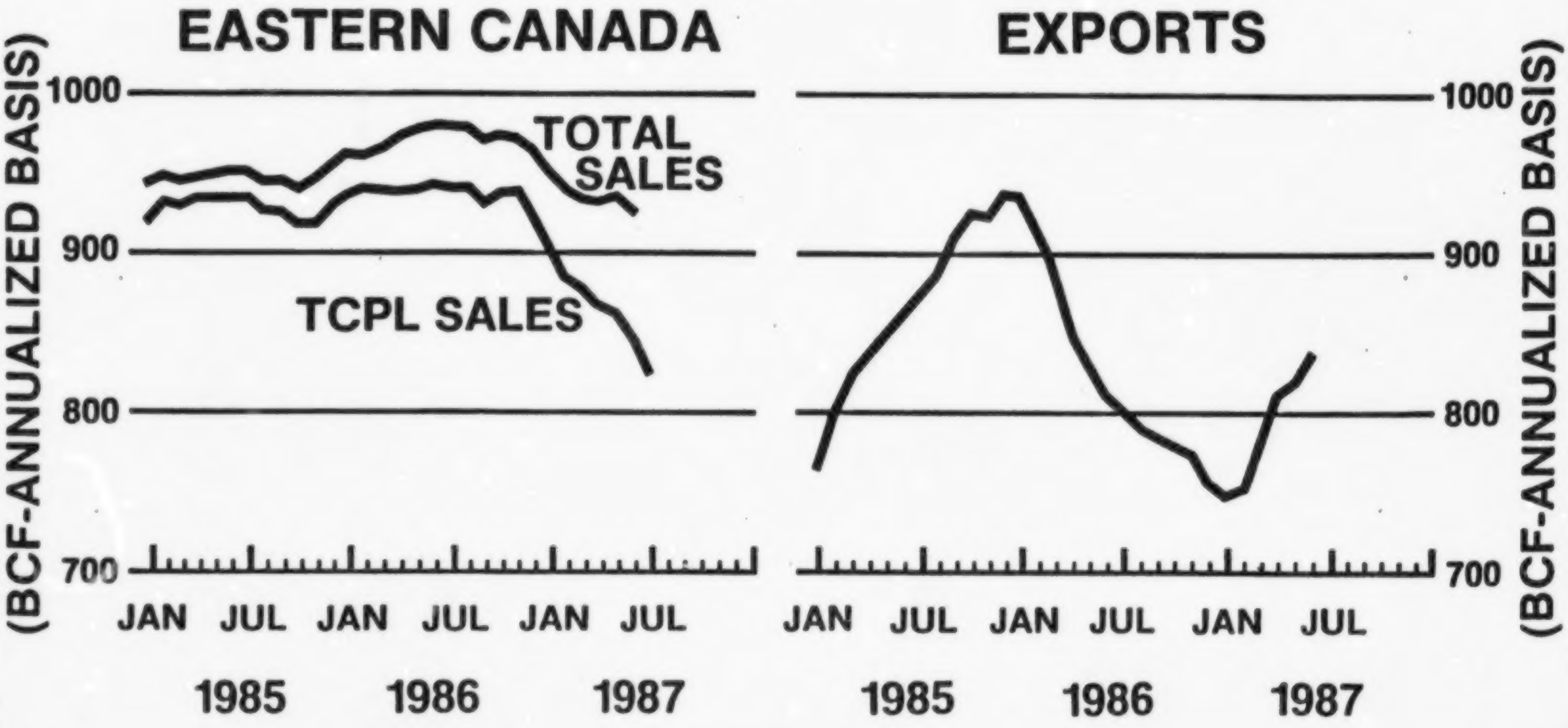
Alberta Plant Gate - TCPL Sales



Canterra

WESTERN CANADA NATURAL GAS DISPOSITION

(12 month moving average)



Canterra

A PRODUCER'S PERSPECTIVE

MARKETING RESULTS AND ACTIVITIES

	BEFORE DEREGULATION	NOW
CASH FLOW	INSULATED	NEGATIVE IN SHORT TERM
MANPOWER/ ADMINISTRATION	MINIMAL	GROWING

Canterra

A PRODUCER'S PERSPECTIVE
MARKETING RESULTS AND ACTIVITIES

	BEFORE DEREGULATION	NOW
CASH FLOW	INSULATED	NEGATIVE IN SHORT TERM
MANPOWER/ ADMINISTRATION	MINIMAL	GROWING
MARKETING STRATEGY	MINIMAL	SIGNIFICANT

Canterra

A PRODUCER'S PERSPECTIVE

INGREDIENTS TO SUCCESSFUL MARKETING

- RESERVES
- TRANSPORTATION
- MARKETING EXPERTISE
- REGULATORY APPROVALS

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A PRODUCER'S PERSPECTIVE
EXTERNAL FACTORS

	BEFORE DEREGULATION	NOW
COMPETITORS	E & P	E& P, MARKETING

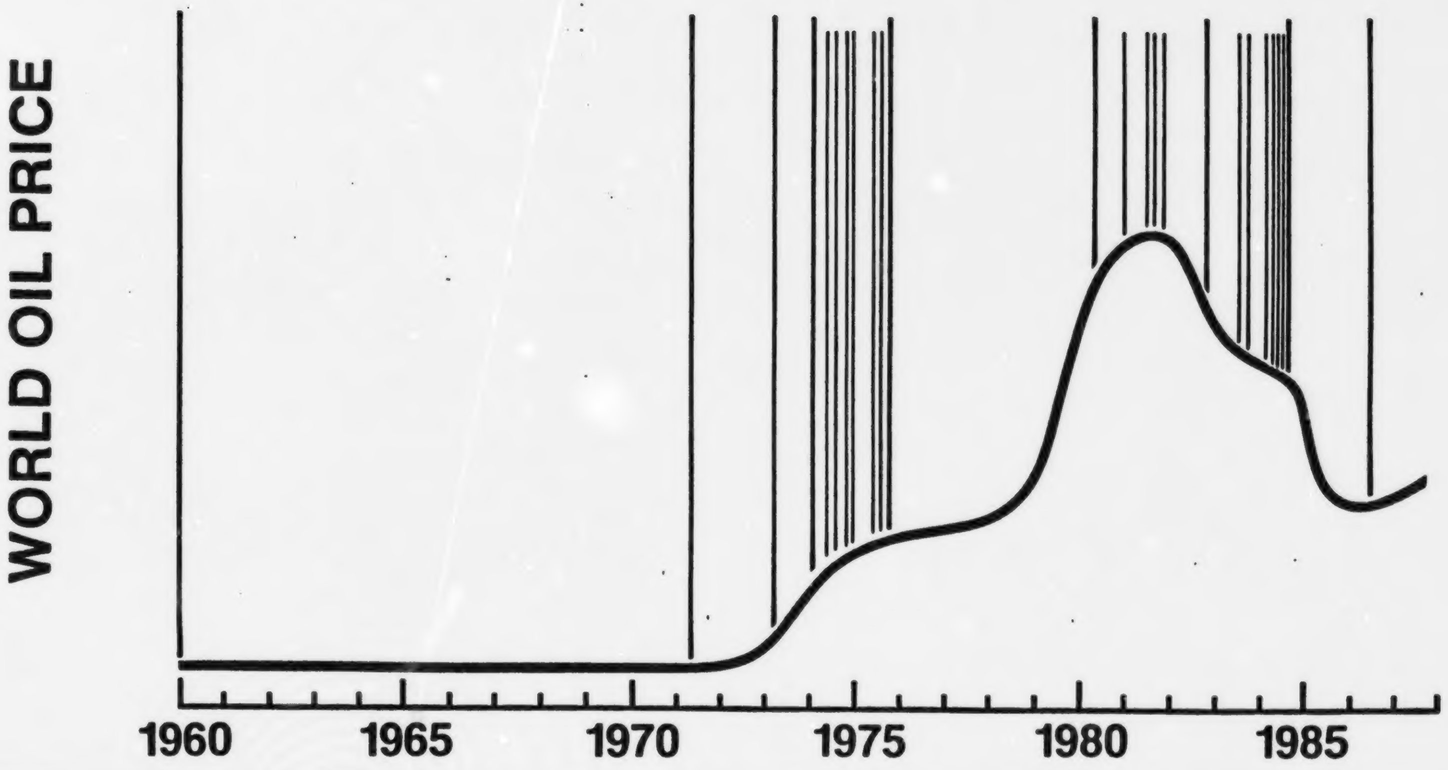
Canterra

A PRODUCER'S PERSPECTIVE
EXTERNAL FACTORS

	BEFORE DEREGULATION	NOW
COMPETITORS	E & P	E&P, MARKETING
GOVERNMENT ROLE		
• PRICING	MAJOR	MINOR

Canterra

MAJOR CANADIAN PETROLEUM POLICIES



Canterra

THE EFFECTS OF THE NOVEMBER 1986 DEREGULATION OF THE CANADIAN GAS INDUSTRY

"A PRODUCER'S PERSPECTIVE"

REVIEW AND OUTLOOK FOR U.S. REFINERS

Presented by

Malcolm M. Turner

President

Turner, Mason & Company

At

The Sixth Annual

International Oil and Gas Markets Conference

September 27-29, 1987

Calgary Convention Centre

Calgary, Alberta

REVIEW AND OUTLOOK FOR U.S. REFINERS

Presented by
Malcolm M. Turner
President
Turner, Mason & Company
Dallas, Texas

It is fair to characterize the last fifteen years for U.S. refiners as predominantly "government regulatory driven". This characterization stands in sharp contrast to the 1960's, which could fairly be called "market driven" for the refining industry. Many of you remember that we charted and projected prices, demands, operating costs and virtually all relevant parameters by extrapolating straight lines on rectangular graph paper. We used fifteen-year project lives for economic studies of expansions and new units, and we believed (amazingly) our discounted cash flow calculations!

(Slide 1) For the most part, such ideas have been hopelessly inadequate and irrelevant for refining economics studies during the last fifteen years. For example, take U.S. refiners' crude oil acquisition costs. Beginning with the 1973 embargo, we see a dramatic rise from under $4 per barrel to almost $36 per barrel in 1981 -- the year of price decontrol. Following steady declines through 1985 to about $28 per barrel, the bottom fell out in 1986 as prices headed to about $12 per barrel. Last year at this time, the prevailing view in the industry and the financial community called for $15 per barrel crude costs, rather than the $19 to $20 per barrel we are actually experiencing.

(Slide 2) Equally perplexing has been U.S. gasoline demand, which grew from less than 6.0 million barrels per day in 1970 to a peak of about 7.4 million barrels per day in 1978. The early 1980's brought demands below 6.5 million barrels per day and forecasts for below 6.0 million barrels per day. Instead, we have averaged above 7.0 million barrels per day gasoline demand in 1987 and find embarrassed forecasters scrambling for explanations for unexpected growth. Industry figures indicate a demand growth rate of almost 2% for U.S. gasoline since 1982 rather than the anticipated decline.

(Slide 3) What about product qualities? For motor gasoline, the Environmental Protection Agency (EPA) lead removal requirements have resulted in remarkably steady and sharp drops in gasoline octane quality for more than fifteen years. (Slide 4) Motorists have experienced sharp rises and falls in gasoline prices, but unknown generally, they have purchased each year poorer quality products -- thanks to "government regulatory driven" forces. Distillates and residuals have changed very little in quality.

(Slide 5) A look at crude runs and imports over the last fifteen years or so reveals peaks in the late 1970's with bottoming in the first half of the 1980's before resuming impressive growth rates -- again, refuting the consensus view prevailing only a short while ago. Also, I note that refiners' utilization of operable distillation capacity has averaged about 81% this year, after plummeting to a low of 68.5% in 1981.

(Slide 6) For most purposes, it has been fair to characterize the petroleum refining industry as "mature" for many, many years. Yet, the dramatic impacts of international events and government regulatory actions have provided opportunities in certain instances that are normally associated only with growth industries. Indeed, there has even been impressive absolute growth in demand for two petroleum products -- premium gasolines and jet fuels. For both products, growth has been brought about by "market driven" forces which will be emphasized in the remaining time available this morning.

Although we certainly do not foresee a return to the 1960's-type environment (I believe there were fewer than fifteen persons employed by the federal government then to administer all government/refiner matters), we do foresee a marked shift away from the "government regulatory driven" dominance of the last fifteen years. Of course, we will continue to have substantial environmental regulatory impacts indefinitely, but we now have gasoline lead removal behind us. Hazardous waste cleanup and control, sulfur levels in diesel fuel and gasoline vapor pressures are matters at the forefront today and will continue to be hot topics. Nevertheless, I believe the shift has already been made in the refining industry, and we are definitely now in a "market driven" era.

When Turner, Mason & Company was originally engaged by the National Petroleum Council for consulting services relating to their recent U.S. refining outlook study, NPC forecasts called for growth in demand for unleaded premium gasoline to exceed 18% by 1988. This level of market penetration was, in fact, exceeded prior to completion of our work in 1986. We are now projecting the following gasoline grade distribution for 1992:

Grade	(R+M)/2	%
Regular	87	50
Mid-Grade	89	20
Premium	92	30

(Slide 7) For years, planners and forecasters assumed that once lead was removed from gasoline, refiners would be required to produce 87 clear pool octane and no more. Now it appears such refiners will be non-competitive by two numbers and soon! Less than a year ago, some observers believed that unleaded premium would settle at 91 octane. Others, including TM&C, pointed toward 92 octane. Now, we have Exxon advertising aggressively its new 93 octane premium. Clearly, this is evidence of "market driven" impacts, and there will be more to come. Our projection may indeed prove to be conservative. It is reasonable to expect automobile manufacturers to react promptly in offering high performance engines requiring premium grade gasoline to a motoring public with a remarkable appetite. Such an event seems much less dramatic and bold than Honda's recent introduction of four-wheel steering.

Following the reasonably tolerable years of 1985 and 1986, refiners have realized lousy margins for the most part in 1987. It is interesting to reflect on the outlooks prevalent in the industry during late 1986 and early 1987. Most, including TM&C, expected at least a fairly good year in 1987, but what we have experienced caused Ashland, a leading independent refiner, to actually announce with joy its forecast to "break even in the fiscal third quarter and see a modest fourth quarter profit". In fact, very few refiners have realized profits, and many ideas of explanation have been advanced to explain the dismal first half 1987.

(Slide 8) TM&C has for several years used proprietary refining models as a basis for economic studies. For most situations, these are based on U.S. Gulf Coast low conversion (100,000 B/D capacity with cat cracker) and high conversion (300,000 B/D capacity with coker and hydrocracker units) models. Without delving into the details, I will present the historical performance of these models since 1983. Note that the first half of 1987 stands out as nothing less than horrendous!

(Slide 9) A simple yardstick of refining economics on the Gulf Coast is the 3:2:1 spot price crack spread. Our forecast made earlier this year pegged the crack spread at $3.04 per barrel. This performance level corresponds with very modest refinery profit levels. Currently, the crack spread is less than $1.25 per barrel, and refiners continue to hurt financially. (Slide 10) Gasoline has clearly been the disappointing performer, although diesel has also fared poorly. (Slide 11) The cyclical history of the industry supports with some certainty improvement ahead in refiners' margins. To bring 1987 to the half-tolerable level, sharp price improvements must come quickly.

(Slide 12) You are aware that EPA has proposed rather drastic reductions in gasoline RVP specifications. Hearings are scheduled in late October, and TM&C is retained by the American Petroleum Institute (API) to help develop the industry response to EPA's proposals. Surveys of refiners' actual plans have been conducted to approximate impact on the total industry as well as individual refiners. In addition, industry models of several classes of refiners have been used by our firm to compute economic penalties of the proposed regulations. Needless to say, they are severe both with respect to capital requirements and increased operating costs. Motorists will pay dearly if these regulations are enacted as proposed, and the industry will undergo another period of hyperactivity. Environmental and health benefits are totally nil in most geographical areas and suspect, at best, in others. Interestingly, the impact of the regulations could, however, work to the economic advantage of certain well-positioned companies.

(Slide 13) The crux of our overall outlook for improvement in refiners' margins and economic performance for the next few years is based on our assessment of the industry's gasoline manufacturing capability. During the 1970's, refiners were able to contain surplus capability in a 5% to 10% range, for the most part. With satisfactory growth through 1978 and the competitive numbness resulting from years of price controls, refiners launched into ambitious expansion and upgrading capital investment programs. A dramatic rise in surplus gasoline manufacturing capability resulted and hung over the industry through 1985. In 1986, the surplus had been absorbed to about the 8.5% level, and accordingly, our firm's outlook became modestly optimistic. Although 1987 has proved to be quite disappointing for most refiners, the tightness in supply capability is bound to bring some recovery in margins.

(Slide 14) Our current projection indicates that without capital additions and other operational improvement programs, U.S. refiners will have inadequate gasoline manufacturing capability to meet motorists' demands in 1990. There are a number of reasons why this situation has developed, not the least of which is general disenchantment with the energy business. To develop this projection, we have used the gasoline grade forecast presented earlier, along with a modest 1% growth in demand. We caution against viewing these comments as anything more than a restoration of "market driven" forces which will ultimately cause refiners to respond with installation of adequate gasoline manufacturing capability.

Obviously, there are seasonality effects and inventory responses to augment basic processing capability, and we attempt to account for these in our models. In addition, there are individual company and area exceptions to our industry averaging methodology. One might expect some relief from imports, but by and large, non-U.S. refiners have their hands full so far as manufacturing U.S.-quality gasoline grades is concerned. There is no great prospect for a flood of imports, in my opinion. Therefore, with the fundamentals working in their favor for a change, U.S. refiners should have their best opportunity in years for stable profits and the chance to respond and plan for changes in an orderly manner. It is certainly going to be a welcome relief to the well-managed and adequately-financed refiners.

(Slide 15) Finally, I present our firm's demand forecast for major products and refinery crude runs. This information is offered with substantial caution, as I keep in my desk drawer this reminder: "Forecasting can be very difficult, especially if it concerns the future."

DR. NEIL WEBBER

SPEECH TO THE SIXTH ANNUAL INTERNATIONAL OIL AND GAS MARKETS CONFERENCE

TUESDAY, SEPTEMBER 29, 1987, CALGARY, ALBERTA

GOOD AFTERNOON, LADIES AND GENTLEMEN. IT IS A REAL PLEASURE FOR ME TO BE HERE TO SPEAK TO CERI'S 6TH ANNUAL INTERNATIONAL OIL AND GAS MARKETS CONFERENCE.

LAST YEAR, UNFORTUNATELY, I WAS UNABLE TO ATTEND. I WAS HOSTING THE ANNUAL CANADIAN MINES MINISTERS' CONFERENCE.

I SAY UNFORTUNATELY, BECAUSE OF THE GOOD AND WELL DESERVED REPUTATION OF THIS CONFERENCE.

HOWEVER, I MIGHT ALSO HAVE SAID FORTUNATELY BECAUSE LAST YEAR AT THIS TIME IT WOULD HAVE BEEN VERY DIFFICULT TO SPEAK WITH THE CONFIDENCE AND OPTIMISM I FEEL TODAY. THIS YEAR IT IS MUCH EASIER TO SPEAK OPTIMISTICALLY AND REALISTICALLY SO, ABOUT THE INDUSTRY IN ALBERTA. THE IMPROVEMENT IN OUTLOOK AND ACTIVITY HAS BEEN SIGNIFICANT.

TODAY I WANT TO EMPHASIZE THREE AREAS.

FIRST, I WANT TO TALK ABOUT THE RESTORATION OF INTEREST IN THE CONVENTIONAL INDUSTRY IN ALBERTA. THIS YEAR WE HAVE SEEN A LARGE INFLUX OF NEW VENTURE CAPITAL AND A SURGE IN DRILLING ACTIVITY WELL BEYOND FORECAST LEVELS. THE INVESTMENT AND THE ACTIVITY ARE SOUNDLY BASED ON THE REAL PROSPECTS AND RETURNS FROM EXPLORATION AND PRODUCTION IN ALBERTA.

SECOND, I WANT TO DRAW ATTENTION TO THE HEAVY OIL AND OIL SANDS SECTOR. THIS YEAR WE HAVE SEEN GROWING INTEREST IN BITUMEN AND HEAVY OIL PROJECTS. HOWEVER, WE NEED FURTHER EFFORTS BY BOTH THE PUBLIC AND PRIVATE SECTORS TO PROCEED WITH THE INTEGRATED OIL SANDS PROJECTS AND UPGRADING FACILITIES REQUIRED TO MAINTAIN ALBERTA'S SUPPLY CAPABILITY AND TO CONTRIBUTE TO CANADA'S SUPPLY SECURITY.

FINALLY, NATURAL GAS. AT PRESENT, GLUTTED NATURAL GAS MARKETS AND DEPRESSED PRICES REPRESENT A REAL CHALLENGE TO MARKETERS OF NATURAL GAS. BUT THE OUTLOOK IS BRIGHT. WE HAVE MADE SUBSTANTIAL PROGRESS ON DEREGULATION. MARKETS WILL PICK UP AS SUPPLIES TIGHTEN IN THE U.S.

LET ME ELABORATE ON EACH OF THESE AREAS.

FIRST, THE CONVENTIONAL INDUSTRY. ACTIVITY HAS REBOUNDED FROM THE DEPRESSED DAYS OF 1986. GOING INTO 1987, MOST FORECASTS CALLED FOR A FURTHER DROP IN ACTIVITY BELOW 1986. THESE PROJECTIONS REFLECTED THE PRICE DROP OF 1986, THE CONTINUING UNCERTAINTY ABOUT PRICE AND THE CONSTRAINTS RESULTING FROM CASH FLOWS CUT IN HALF.

1987 STARTED SLOWLY. FIRST QUARTER DRILLING ACTIVITY LEVELS WERE WELL BELOW THE RECORD LEVELS OF FIRST QUARTER 1986. SECOND AND THIRD QUARTER LEVELS, CONVERSELY, HAVE BEEN WELL ABOVE THOSE OF 1986. INDEED 1987 SO FAR HAS BEEN COMPLETE REVERSE OF 1986.

THE CANADIAN ASSOCIATION OF OILWELL DRILLING CONTRACTORS HAS BEEN REVISING ITS DRILLING FORECASTS UPWARD THROUGHOUT THE YEAR. ITS PRESENT FORECAST HAS DRILLING IN THE THIRD AND FOURTH QUARTER TO BE 35% ABOVE THE ORIGINAL FORECAST.

TODAY, 280 RIGS WERE DRILLING OR MOVING -- OVER TWICE 1986 LEVELS -- AND AN INCREASE OF 34 RIGS OVER 1985, A VERY GOOD YEAR.

LAND SALES FROM APRIL TO SEPTEMBER REACHED $386.8 MILLION, A 322% INCREASE OVER 1986. THE LAST LAND SALE BROUGHT IN OVER $55 MILLION, THE LARGEST TOTAL SINCE 1980. WELL LICENSES OVER THE SAME PERIOD HAVE INCREASED 129% OVER 1986.

IN SHORT, DRILLING RIG ACTIVITY HAS CLIMBED ABOVE 1985 LEVELS -- LEADING TO FORECASTS OF FULL RIG EMPLOYMENT LATER THIS YEAR. PETROLEUM INTELLIGENCE WEEKLY, FOR INSTANCE, FORECASTS COMPLETE UTILIZATION OF DRILLING CAPACITY THIS WINTER.

THIS IS GOOD NEWS FOR THE SERVICE AND SUPPLY INDUSTRY WHICH HAS BEEN PARTICULARLY HARD HIT BY THE PRICE DECLINE. THIS SECTOR SHOULD SEE INCREASED REVENUE AND INCREASED EMPLOYMENT AS RIG UTILIZATION INCREASES.

THE ATTRACTIVENESS OF THE ALBERTA CONVENTIONAL INDUSTRY IS WIDELY RECOGNIZED OUTSIDE ALBERTA. IN THE FIRST EIGHT MONTHS OF 1987 JUST UNDER $3 BILLION OF NEW EQUITY INVESTMENT WAS ATTRACTED TO ALBERTA. THIS COMPARES WITH $2.6 BILLION IN THE WHOLE OF 1985 -- WHICH WAS A VERY GOOD YEAR FOR THE INDUSTRY. DURING RECENT DISCUSSIONS WITH NEW YORK INVESTMENT

BANKS THEY EMPHASIZED THEIR CLIENTS' ENTHUSIASM FOR ALBERTA. I MET A NUMBER OF SMALL INVESTMENT COMPANIES INVESTING IN ALBERTA FOR THE FIRST TIME. SOME OF THEM, I NOTE - INVESTING IN ALBERTA GAS.

WHY THE ACTIVITY? WHY THE INTEREST?

THERE ARE BASICALLY THREE REASONS.

1. FIRST, FIRMER PRICES PROVIDE A MORE STABLE BASIS FOR PLANNING AND INVESTMENT. MOST FORECASTERS AGREE THAT PRICES WILL HOLD, AND PERHAPS EVEN INCREASE, IN THE SHORT TERM.

   RECENTLY DEVELOPMENTS IN THE PERSIAN GULF HAVE LED TO PRICE FLUCTUATION. INCREASING TENSION LED TO HIGHER SPOT PRICES AND INCREASED LIFTINGS FROM THE AREA. HOWEVER, INCREASED LIFTINGS, IN TURN, EXERTED DOWNWARD PRESSURE ON PRICES -- AND BUILT UP A LONGER TERM CONCERN THAT LARGE INVENTORIES COULD UNDERMINE PRICES IN THE FOURTH QUARTER, AND IN EARLY 1988.

   NONETHELESS, OPEC MEMBERS HAVE HELD TO THEIR PRICE TARGETS AND SHOW EVERY INTENTION OF CONTINUING TO DO SO. FROM MY DISCUSSIONS WITH ANALYSTS IN NEW YORK AND HOUSTON, THERE EVEN APPEARS TO BE A FAIR PROBABILITY OF A SLIGHT INCREASE IN OFFICIAL PRICES IN 1988.

2. SECONDLY, ALBERTA CONTINUES TO HAVE EXCELLENT GEOLOGICAL PROSPECTS. FINDING COSTS IN ALBERTA HAVE BEEN CUT FROM A HIGH OF $14 IN 1981 TO UNDER $8 IN 1985. OVER THE LAST COUPLE OF YEARS COSTS HAVE BEEN REDUCED FURTHER. FOR SOME PLAYS THEY RUN AS LOW AS $4.00. FINDING COSTS IN ALBERTA ARE CURRENTLY ABOUT 1/2 THOSE OF THE LOWER 48 STATES.

3. THIRDLY, WE HAVE DEMONSTRATED CONSIDERABLE FLEXIBILITY IN ADJUSTING THE FISCAL REGIME IN ALBERTA.

   - WE REDUCED AVERAGE GROSS ROYALTIES BY 4% FOR OLD OIL AND GAS AND 12% FOR NEW OIL AND GAS.

   - WE INTRODUCED A ROYALTY HOLIDAY PROGRAM
     - 5 YEARS UNTIL OCT. 31, 1987
     - 3 YEARS UNTIL OCT. 31, 1987
     - 1 YEAR UNTIL OCT. 31. 1989

   - IN ADDITION WE HAVE SEEN A FEDERAL RESPONSE:
     - REMOVAL OF NEP TAXES
     - INTRODUCTION OF CEDIPS
     - TAX REFORM

THE RESULT IS THAT THE RETURNS FROM EXPLORATION IN ALBERTA TODAY ARE MORE ATTRACTIVE THAN IN 1985, PRIOR TO THE PRICE COLLAPSE. THIS REFLECTS THE RESPONSIVENESS OF THE FISCAL SYSTEM -- AND SHOWS THAT NO FURTHER FISCAL CHANGE IS REQUIRED FOR THE CONVENTIONAL INDUSTRY.

WE HAVE ANALYZED THE RETURNS AND THE PAYBACK PERIODS FOR MAJOR PLAYS THROUGHOUT ALBERTA. KEEPING IN MIND THAT INDIVIDUAL PLAYS ARE SUBJECT TO CONSIDERABLE VARIATION, THE AVERAGE PAYBACK PERIOD WAS UNDER 3 1/2 YEARS AND THE RATE OF RETURN ON INVESTMENT AVERAGED FROM 27 - 43%. THIS ANALYSIS MADE ALLOWANCE FOR EXPLORATION RISK. IT FACTORS IN THE COSTS OF EXPLORATION INCLUDING LAND, GEOLOGICAL AND DRILLING COSTS. IT INCLUDES DEVELOPMENT COSTS -- BOTH DEVELOPMENT WELLS AND ONSITE COSTS. IT WAS BASED ON THE CURRENT FISCAL REGIME.

IN OTHER WORDS THE ACTIVITY IS ON A FIRM BASIS, THE BEST BASIS -- ATTRACTIVE RETURNS ON INVESTMENT. IN EFFECT, THE ALBERTA GOVERNMENT ASKED THE INDUSTRY IN 1986: "IF WE PROVIDE AN ATTRACTIVE INVESTMENT CLIMATE, WOULD THE INDUSTRY STEP UP ACTIVITY?" THE ANSWER IS AN UNQUALIFIED YES.

THE OUTLOOK FOR THE CONVENTIONAL INDUSTRY IS GOOD. ACTIVITY IS BASED SOUNDLY, ON THE ECONOMICS OF EXPLORATION AND PRODUCTION. WE CAN EXPECT CONTINUED OPERATION AT A HEALTHY LEVEL.

2. HEAVY OIL AND OIL SANDS

LET ME TURN TO ANOTHER SECTOR OF THE OIL INDUSTRY -- THE DEVELOPMENT OF HEAVY OIL AND OIL SANDS.

HERE TOO, THE COMBINATION OF FIRMER PRICES AND AN APPROPRIATE FISCAL REGIME HAS RESULTED IN INCREASED INDUSTRY ACTIVITY -- AND A NUMBER OF PROJECT ANNOUNCEMENTS. FOR EXAMPLE:

IN JUNE, BP CANADA AND PETROCANADA ANNOUNCED THAT THEY ARE PROCEEDING WITH PHASE II OF THE WOLF LAKE PROJECT. THEY WILL INVEST $200 MILLION AND INCREASE PRODUCTION TO 15,00 BARRELS PER DAY.

IN JULY SUNCOR ANNOUNCED A $150 MILLION EXPANSION TO ADD 10,000 BARRELS PER DAY OF PRODUCTION CAPACITY AND 10,000 BARRELS PER DAY OF UPGRADING CAPACITY.

IN AUGUST, ESSO RESOURCES BEGAN PROCEEDING WITH PHASES 7 THROUGH 10 OF ITS COLD LAKE HEAVY OIL DEVELOPMENT PROJECT. THE $325 MILLION PROJECT WILL INCREASE PRODUCTION BY 40,000 BARRELS PER DAY BY 1990.

IN ADDITION A NUMBER OF SMALLER PROJECTS WERE ANNOUNCED. IN THE ELK POINT-LINDBERGH AREA A NUMBER OF COMPANIES ANNOUNCED INCREASED DRILLING AND STEAMING ACTIVITY. AMOCO, FOR EXAMPLE, ANNOUNCED IT WAS PROCEEDING WITH AN $11 MILLION PROJECT IN THE ELK POINT AREA.

COLLECTIVELY, THESE ANNOUNCEMENTS SHOW THE ATTRACTIVENESS OF FIELD EXTRACTION OF BITUMEN AND HEAVY OIL AT CURRENT PRICES AND WITH THE PRETAX REFORM FISCAL REGIME. WE EXPECT FURTHER ANNOUNCEMENTS BY COMPANIES OF THEIR INTENSIONS TO PROCEED WITH FIELD DEVELOPMENT. HOWEVER, THE DETRIMENTAL IMPACT OF TAX REFORM ON SUCH PROJECTS DOES REQUIRE ATTENTION. BUT WE SEE NO NEED FOR ALBERTA TO IMPLEMENT SPECIAL FISCAL INCENTIVES FOR FIELD DEVELOPMENTS.

THE COST CUTTING WE SAW IN THE CONVENTIONAL INDUSTRY IS ALSO APPARENT IN THE HEAVY OIL AND OIL SANDS AREA. HERE IT IS EVEN MORE SIGNIFICANT, FOR PROJECTS WHICH MAY HAVE BEEN PORTRAYED AS UNECONOMIC BASED ON OUT-DATED COST PROJECTIONS LOOK FAR MORE FEASIBLE BASED ON MORE RECENT COST ANALYSES.

THE ALBERTA CHAMBER OF RESOURCES PREPARED A REPORT ON COSTS THIS JULY. THEY CONSULTED EXTENSIVELY WITH INDUSTRY INVOLVED IN THE OIL SANDS. THE CHAMBER STUDY SHOWS THAT THE SUPPLY COST OF SYNTHETIC CRUDE OIL FROM OIL SANDS COULD BE UNDER $30 CANADIAN PER BARREL. IN OTHERWORDS, THE CHAMBER FOUND THAT THE COST RANGE FOR OIL SANDS DEVELOPMENT HAS CHANGED, IN U.S. DOLLARS, FROM THE HIGH TWENTIES TO THE LOW TWENTIES.

NONETHELESS, DEVELOPMENT OF INTEGRATED OIL SANDS AND HEAVY OIL UPGRADING PROJECTS REMAINS DIFFICULT AT THIS TIME. THESE PROJECTS INVOLVE LARGE CAPITAL INVESTMENTS AND LONG LEAD TIMES BEFORE THEY GENERATE CASH FLOW. INDUSTRY IS UNDERSTANDABLY CAUTIOUS ABOUT COMMITTING TO SUCH PROJECTS. WHILE PRICES ARE LIKELY TO STRENGTHEN SUCH THAT THEY WILL JUSTIFY THESE PROJECTS BY THE TIME PRODUCTION COMMENCES, COMPANIES HAVE TO CONSIDER THE IMPACT OF PRICE DISRUPTIONS.

IN SHORT, THERE ARE HIGH UP FRONT COSTS, LONG LEAD TIMES AND CONSIDERABLE COMMERCIAL RISK. COMPANIES HESITATE.

HOWEVER - IT IS IMPORTANT THAT WE CONTINUE TO MAKE PROGRESS IN DEVELOPING THESE RESOURCES. THEY REPRESENT RELIABLE, LONG TERM SUPPLIES -- SUPPLIES NEEDED TO SUSTAIN ALBERTA'S PRODUCTIVE CAPACITY -- AND ITS ABILITY TO RESPOND TO CANADIAN AND U.S. ENERGY REQUIREMENTS.

THIS IS AN AREA WHERE GOVERNMENTS HAVE A ROLE. WHEN PROJECTS ARE ECONOMIC, WHEN IT IS IN THE PUBLIC INTEREST THAT THEY PROCEED -- THEN GOVERNMENTS HAVE A RESPONSIBILITY TO ALLEVIATE RISK AND HELP THE PROJECTS OVER THE INITIAL HURDLES.

THIS IS NOT JUST THE POSITION OF THE ALBERTA GOVERNMENT. IT IS A VIEW THAT HAS BEEN ENDORSED BY ALL CANADIAN ENERGY MINISTERS AND FIRST MINISTERS.

THIS YEAR WE HAVE HAD TWO MEETINGS WITH FEDERAL AND PROVINCIAL ENERGY MINISTERS ADDRESSING THIS ISSUE IN THE CONTEXT OF OIL SUPPLY SECURITY FOR CANADA. ALBERTA FOCUSSED ON THE SUPPLY SIDE OF SECURITY - PROCEEDING WITH THESE MAJOR PROJECTS IN ORDER TO DEVELOP THE OIL SUPPLIES WE WILL NEED IN THE 1990S. IF WE HAVE RESOURCES, WE SHOULD ENCOURAGE THE PETROLEUM INDUSTRY TO DEVELOP THEM. MINISTER MASSE AND MY PROVINCIAL COLLEAGUES AGREED THAT GOVERNMENTS NEED TO BE INVOLVED TO BRING THESE PROJECTS ON STREAM, BY HELPING TO ALLEVIATE THE RISKS SO THAT THE PROJECTS BECOME COMMERCIALLY MORE ATTRACTIVE.

ONE WRINKLE THAT HAS DEVELOPED THIS YEAR IS TAX REFORM. THE OBJECTIVES OF TAX REFORM ARE BEYOND DISPUTE. CERTAIN MEASURES HAVE BENEFITTED THE CONVENTIONAL INDUSTRY. BUT WHAT IS OF SOME CONCERN IS THE POTENTIAL DETRIMENTAL IMPACT OF TAX REFORM ON MAJOR RESOURCE PROJECTS.

THE FEDERAL GOVERNMENT - BOTH FINANCE, AND ENERGY, MINES AND RESOURCES, HAVE DEMONSTRATED THAT THEY RECOGNIZE THE ADVERSE IMPACT OF TAX REFORM AND THE NEED TO NEGOTIATE NON-TAX PROVISIONS TO ASSIST MAJOR PROJECTS. OF COURSE THIS INVOLVES MORE THAN SIMPLY REPLACING THE BENEFITS LOST. WE NEED TO FIND POSITIVE MEANS TO ENCOURAGE THE PROJECTS. I AM CONFIDENT THAT WE CAN WORK TOGETHER ON THIS OBJECTIVE -- ALBERTA GOVERNMENT, FEDERAL GOVERNMENT, OTHER PROVINCIAL GOVERNMENTS AND, MOST IMPORTANTLY, THIS INDUSTRY.

AT PRESENT WE ARE EXPLORING A NUMBER OF SPECIFIC PROJECTS WITH THE FEDERAL GOVERNMENT -- THE BI-PROVINCIAL UPGRADER, FOR ONE. A MAJOR OBJECTIVE OF THE ALBERTA GOVERNMENT IS TO EXPEDITE PROGRESS OF UPGRADING AND OIL SAND DEVELOPMENT.

3. NATURAL GAS

THE OUTLOOK FOR NATURAL GAS TENDS TO BE LIKE A TYPICAL ALBERTA WEATHER FORECAST GOING INTO A LONG WEEKEND: 'CONTINUING UNSEASONABLE LOWS FOR THE WEEKEND, WITH WARMING AND CLEARING BEGINNING MONDAY AFTERNOON'. IN THE SHORT TERM THE GAS INDUSTRY IS FACED WITH DEPRESSED PRICES AND CONSTRAINED MARKETS. IN THE LONGER TERM THE OUTLOOK BRIGHTENS.

FREQUENT REPETITIONS OF ANY PHASE WEAKENS ITS IMPACT. WE HAVE COME TO EQUATE 'THE GAS BUBBLE WILL BURST' WITH 'THE CHECK IS IN THE MAIL'. NONETHELESS BOTH CAN BE TRUE -- AND WE CAN REASONABLY EXPECT INCREASING U.S. DEMAND FOR ALBERTA GAS AND AN INCREASE IN GAS PRICES -- PROBABLY

BEGINNING IN 1989. RECENTLY A NOTED ENERGY ANALYST POINTED OUT THAT ALBERTA GAS HAS THE MOST POTENTIAL FOR APPRECIATION OF VALUE OF ANY ENERGY RESOURCE.

THE QUESTION IS HOW DO WE GET THERE FROM HERE?

WE BEGAN THE PROCESS OF DEREGULATION IN 1985 WITH THE AGREEMENT ON NATURAL GAS MARKETS AND PRICING. WE DID SO RECOGNIZING THE LEGACY OF OVER A DECADE OF REGULATED PRICES AND EXPORT CONTROLS: A SUBSTANTIAL SURPLUS OF DELIVERABILITY AND RESERVES WELL IN EXCESS OF CANADIAN DOMESTIC REQUIREMENTS AND CURRENT EXPORT DEMAND. WE RECOGNIZED THE NEED FOR A GRADUAL AND BALANCED TRANSITION AND FOR THE COORDINATION OF DOMESTIC DEREGULATION WITH INCREASED ACCESS TO U.S. MARKETS FOR CANADIAN GAS.

THE KEY TO DEREGULATION WAS, AND IS, "AN ORDERLY TRANSITION WHICH IS FAIR TO CONSUMERS AND PRODUCERS'. DEREGULATION WAS INTENDED TO PROVIDE BALANCED BENEFITS TO CONSUMERS AND PRODUCERS AND, BETWEEN SYSTEM AND NON-SYSTEM PRODUCERS.

THE BALANCES WERE BASED ON TWO FULCRUMS:

FIRST, RESPECT FOR EXISTING ARRANGEMENTS BETWEEN DISTRIBUTORS, SHIPPERS AND SYSTEM GAS SUPPLIERS. THE EXPECTATION WAS THAT DISTRIBUTORS WOULD CONTINUE TO SUPPLY THE VAST MAJORITY OF SMALL GAS USERS - THE RESIDENTIAL AND COMMERCIAL USERS - UNDER LONG TERM CONTRACTS WITH TCPL AND NEW CONTRACTS FOR INCREMENTAL SUPPLIES. THE NEB DECISION ANNOUNCED LAST FRIDAY REFLECTS THIS EXPECTATION.

AT THE SAME TIME, IT WAS INTENDED THAT LARGE GAS CONSUMERS SHOULD BE ABLE TO ENTER INTO DIRECT SALES WITH PRODUCERS. THIS HAS BEEN VERY SUCCESSFUL. TO DATE OVER 270 MINISTERIAL APPROVALS HAVE BEEN ISSUED FOR DIRECT SALES.

SECOND, THE EXPECTATION OF INCREASED EXPORTS. THIS INVOLVED THE REMOVAL OF CANADIAN REGULATORY BARRIERS SUCH AS EXPORT PRICING AND THE SURPLUS TEST, THE REDUCTION OF U.S. BARRIERS AND THE EXPECTATION THAT THE U.S. GAS BUBBLE WOULD DEFLATE.

CIRCUMSTANCES HAVE ATTEMPTED TO TILT THE BALANCES. AS THE PRICE OF OIL TUMBLED IN 1986, GAS PRICES FELL FURTHER AND STAYED THERE. INDUSTRIAL CUSTOMERS ARE NOW REALIZING PRICES THEY NEVER DREAMED OF WHEN DEREGULATION BEGAN. OTHER USERS HAVE BEEN ATTRACTED BY THE LOW INDUSTRIAL PRICES AND HAVE ATTEMPTED TO GET INTO THE ACTION -- DISREGARDING SYSTEM GAS CONTRACTS, SECURITY OF SUPPLY, LOAD FACTOR OR SEASONALITY CONSIDERATIONS.

AT THE SAME TIME, ACCESS TO U.S. MARKETS HAS BEEN SLOW TO DEVELOP.

- THE GAS BUBBLE HAS BEEN MORE RESILIENT THAN EXPECTED.

- U.S. REGULATORY HURDLES HAVE SPRUNG UP -- THE AS-BILLED DECISION, ZONAL RATHER THAN MILAGE-BASED TOLLS, AND THE FAILURE OF U.S. PIPELINES TO BECOME OPEN-ACCESS TRANSPORTERS.

THE RESULT HAS BEEN TO FOCUS CANADIAN SURPLUS DELIVERABILITY ON THE CANADIAN MARKET -- EXERTING FURTHER DOWNWARD PRESSURE ON GAS PRICES.

THE RECENT NEB DECISION ON THE SURPLUS TEST ADDRESSED ONE MAJOR CONCERN WITH LONG TERM ACCESS TO US. MARKETS. IT REPLACED THE RIGID FORMULA APPROACH WITH A MORE FLEXIBLE APPROACH TO EXPORTS, ONE MORE COMPATIBLE WITH MARKET OPERATIONS. THE DETAILS OF THE COMPLAINTS PROCEDURE, EXPORT IMPACT ASSESSMENT AND PUBLIC INTEREST DETERMINATION MUST BE CLARIFIED. BUT IN SPIRIT, THE NEB REPORT CERTAINLY EMBRACES A MARKET ORIENTED APPROACH TO SURPLUS DETERMINATION. THIS MARKS A LARGE STEP IN GAINING LONG TERM ACCESS TO U.S. MARKETS.

THE OBJECTIVE REMAINS DEREGULATION - BUT IT MUST BE DONE IN A MANNER FAIR TO ALL PARTIES. WE ARE CONTINUING THE TRANSITION - THE NEB DECISION IS THE MOST RECENT STEP IN THAT TRANSITION. WE ARE CONTINUING TO PRESS FOR ACCESS IN THE U.S. FOR EXAMPLE -- I JUST RETURNED FROM HOUSTON WHERE I EMPHASIZED THE IMPORTANCE OF ACCESS TO ALBERTA PRODUCERS.

IN CONCLUSION

THE OUTLOOK FOR ALBERTA OIL AND GAS IS REASONABLY OPTIMISTIC.

- ACTIVITY IN THE CONVENTIONAL EXPLORATION AND PRODUCTION INDUSTRY IS GROWING MONTHLY. IN THE LAST QUARTER OF THIS YEAR ACTIVITY SHOULD RIVAL ACTIVITY IN 1985.

- FIELD DEVELOPMENT OF HEAVY OIL AND BITUMEN IS INCREASING. TAX REFORM HAS BEEN A SETBACK, BUT DISCUSSIONS ARE PROCEEDING ON THIS SUBJECT AND ON HEAVY OIL AND INTEGRATED OIL SANDS PROJECTS. WE ARE CONFIDENT THAT PROGRESS WILL BE MADE IN THE NEAR FUTURE.

- ONLY IN GAS ARE WE FACED WITH PROBLEMS IN THE SHORT TERM. NONETHELESS THE DEREGULATION TRANSITION IS CONTINUING -- AND THE OBJECTIVE REMAINS WIDELY SHARED BY THE WHOLE INDUSTRY, GAS CONSUMERS AND ALL CANADIAN GOVERNMENTS. IN THE LONGER RUN, THE OUTLOOK FOR GAS IS ALSO OPTIMISTIC. AS A GAS-PRONE PRODUCING PROVINCE -- WE CAN LOOK FORWARD TO INCREASED MARKETS FOR OUR MOST PLENTIFUL COMMODITY.

DURING HIS RECENT VISIT, VENEZUELAN ENERGY MINISTER ARTURO HERNANDEZ-GRISANTI REMINDED ME THAT THE ROLE OF THE POLITICIAN IS TO BE OPTIMISTIC. HOWEVER, PRUDENCE DICTATES THAT I ALSO BE REALISTIC. FORTUNATELY, TODAY, I CAN BE BOTH.

FINANCING REQUIREMENTS
OIL AND GAS INDUSTRY
EUROPE

Presented by
T Murray Wilson
Director
Orion Royal Bank Limited
London, England

At
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Calgary, Alberta

FINANCING FOR THE
OIL AND GAS INDUSTRY:
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A. Introduction

Is there sufficient debt and equity funding available for Western European Oil and gas development in the future? Will the London market be a source of debt and equity for the oil and gas industry beyond Europe? How has London's "Big Bang" influenced the availability of funds for the Oil and Gas Industry? What impact does the £8 billion sale of the UK government's shares in BP have on the financial markets? I will address these questions against the backdrop of the oil industry's exploration and development plans and the rapidly changing international financial markets.

In summary my view is that:

In Europe Debt and Equity Finance will not be a practical limitation to the Oil and Gas Industry as a whole, however selective availability is leading to:

- Consolidation/Reorganisation
- Revaluation of assets and corporates
- Lower Debt/Equity ratios

- Shifts towards management teams with "Finance Acceptability" as well as Technical and General Management strengths.

The contents of this presentation, although drawn from my work with Orion Royal Bank Limited, are based upon my own views and do not necessarily represent the views of Orion Royal Bank.

B. Finance Availability

During this presentation I will be giving you a sketch of:

- The availability of finance for the Oil and Gas Industry.

- A view of the order of magnitude of the demand for finance by Europe's Oil and Gas Industry.

- The types of financial transactions which are likely to be utilized in the coming months.

- A view of the evolving nature of London's financial markets as they relate to the Oil and Gas Industry.

In order to leave you with a framework to allow you to form your own views:

Firstly - I will present a review of the reaction of London's financial markets to the past two years of Oil Industry excitement.

Secondly - I will provide a back-drop as to the nature and size of the upstream Oil and Gas Industry development in the foreseeable future.

Thirdly - I will provide some perspective as to the future availability of capital in Europe.

The Oil Price Fall

The figure **Oil Price and FT Oil and Gas Indicies** illustrates the relative movement of oil prices and the Financial Times Oil and Gas Index over the past two years. An index date of 1st August 1985 has been chosen, the index is as the left axis. (On 1st August 1985 the oil price was US$ 29).

From this figure we can see no apparent reaction of the equity markets to the 1986 oil price drop and subsequently to the price firming and price rise during 1987.

The next figure Oil **Price and Relative Share Price Indicies** adds the FT All Share Index.

The Oil and Gas Index shows some deviation from the FT All Share Index, under performing by up to 30% in early to mid 1986, but by mid 1987 overperforming by about 10%.

(Please note that the FT All Share Index has market capitalisation of approximately US$ 680 billion and the FT Oil and Gas Index shares are capitalized at US$ 85 billion).

For comparison the figure Oil **Price and Relative Share Price Indicies (including the Toronto Stock Exchange and Standard and Poors Oil Indicies)** outlines the relative movement of the U.S. and Canadian equity markets over the same period. It seems clear that the Canadian equity markets demonstrated a more dramatic response to the fall in oil prices and a slower response to the subsequent rise.

The figure Oil **Price and Relative Share Price Indicies (including the Independents' Index)** highlights the UK independent sectors response to the oil price fall and the huge recovery in stock prices since then. The figure also illustrates that the principal components of the Oil Index, B.P., Shell and British Gas showed little response to the oil price.

By comparing the Canadian Independents to the integrateds I believe a similar relative behavior is seen. Although I am not sure if the Toronto Stock Exchange (TSE) has behaved in the same way as the London market with relation to the U.K. independents in the past few months. As you can see from our figure the independents have increased in market value almost fourfold - I understand the Canadian independents have basically doubled over the same period.

Although there are many explanations possible, the most important is that U.K. independents have a much higher proportion of their identified proven and probable reserves associated with projects that will not reach production until the 1990's and will continue production well beyond the year 2000.

C. European Environment

When examining the European oil and gas industry it is important to bear in mind the structural aspects that make the European environment fundamentally different from the one found in North America.

First of all, the assets are found principally offshore and in substantial concentrations. Secondly, and consequently, the time between a development decision and production start-up is substantial. Thirdly, and for the purposes of this paper, perhaps most importantly, the industry is dominated by very large companies, frequently directly or indirectly, government controlled. The independents do not play as large a role as in North America.

This to a certain extent explains the relatively limited reaction of the London Stock Exchanges (LSE) FT Oil and Gas Index to the drop in Oil prices.

The next few figures have been produced from aggregated data drawn from British Petroleum and the Departments of Energy in Norway and the U.K.

The figure **Western Europe Oil and Gas Production** illustrates the existing split of production between oil and gas. Western Europe annually produces natural gas at approximately 150 millions of tonnes oil equivalent; oil production is running at about 200 million tonnes. As you can see the U.K. is responsible for approximately one-half of the current oil and gas production combined.

The next figure **Western Europe Oil and Gas Reserves** shows the proven reserves split between oil and gas and shows, that the major future producers are Norway and the Netherlands, and to a lesser degree than present, the UK.

In the future it seems that production will shift further towards natural gas. At present proven reserves of natural gas are more than double those of oil as demonstrated by the figure **Western Europe Oil and Gas.**

The European natural gas utility market is almost totally state controlled. This in my view will be an additional factor placing pressure on the independent sector.

Data we were able to gather from the industry relative to expected exploration and development expenditures in the North Sea is as follows:

- The U.K. Sector estimate is US$ 22-27 Billion

- The Norwegian Sector estimate is US$ 30-35 Billion

Our numbers are much less accurate for the other areas but we presume it is in the order of US$ 8-10 Billion.

Beyond 1991 it is assumed that the U.K. spending will tail off unless there is another ratchet upwards in oil prices while Norwegian expenditure is expected to continue at the same relative rate until beyond the year 2000.

Taken as an aggregate the industry appears to be big enough and sound enough to support the anticipated upstream exploration and development.

The largest nine European oil and gas producers have sales in total of US$ 180 billion and assets in total of US$ 215 billion.

This list includes:

- Shell
- BP
- British Gas
- ENI/Agip
- ENIEPSA/Hispanoil
- SNEA (Elf)
- Total
- Statoil
- Norsk Hydro

Many of the large Western European companies are state controlled and they have been and probably will be unlikely users of the project finance markets. The likelyhood of there being finance opportunities are substantially less than imagined as many companies have credit ratings sufficiently strong enough to make the pricing of project financing unattractive.

The oil and gas industry structure, to summarize, is characterised by:

- large projects;

- long development schedules;

- high exploration and development costs;

- production dominated by the U.K., but shifting towards Norway and the Netherlands;

- natural gas is becoming more important and notwithstanding privatisation moves utility like structures will be of growing importance.

All of these features put pressure on the independent sector.

D. Financing for the Oil and Gas Industry in Europe

Where does this leave us in terms of Financing for the Oil and Gas Industry in Europe?

It leaves us with the view that the Independent Oil Section is more highly priced than one would expect on moderate oil price assumptions. Because of this emotional response to the fall in oil price by both lenders and investors, most companies are under leveraged. My view is that the opportunities for good equity returns is low but the margins for high quality lending are now higher than they have been for sometime.

The substantial volatility in the capitalisation of the independent players indicates an overly emotional response to the fall in oil prices, as well as a quite liberal evaluation of future prospects. The liberal evaluation reflects partially, optimism relative to oil prices expected over the relatively long life of the underlying assets. Additionally the current market valuation incorporates values based upon, the expectation that there will be the ability to offset future exploration expenditure through the shielding of Petroleum Revenue Tax "PRT" due on existing or planned production, and the expectation of lower cost of development.

The typical independent oil company in the U.K. faces development expenditure on one or several of its assets, which in many cases is very large by comparison to the company's existing capitalisation, and in a number of cases is greater by some order of magnitude, than the total existing capitalisation. When estimating the future cash flow to be generated by a specific asset, the shielding of PRT payments will have a substantial impact.

To provide some analytic backdrop to this independent sector activity the figure **Cash Flow Forecasts** illustrates a cash flow projection for a typical U.K. Independent Sector company. In many cases the NPV of the PRT payments can be very substantial - equity for exploration is essential to maximise value. It is not unusual for future development expenditures to be as much as two or three times market capitalisation.

As I mentioned earlier many of the U.K. Independents are valued quite highly in comparison to the typical oil analyst's view.

One of the reasons for this may be that while most analysts will assume no exploration shielding of PRT payments - the market itself may - bid speculation and corporate investors (either passive or takeover oriented) have driven many share prices beyond what the after PRT cashflows have traditionally implied.

Given a cashflow future as illustrated in this figure how does an Independent look towards the future with regard to its capital structure?

In this example figure **Financing Requirements** it may be that existing equity and debt allow the company to move ahead for another year or so, and although the company can foresee being able to arrange a certain amount of debt funding for its future projects - its funding requirements outstrip the availability in the debt markets.

The company is then faced with the decision of whether to issue new equity, with potential substantial dilution of existing shareholders, or to sell down part of its assets, or to look for a source of capital with both debt and equity characteristics.

In the wake of this type of pressurized environment for the Independents we have in London been exposed to:

- Bursts of Equity Issues
- Corporate Transactions
- Alternative Financing Structures

The last major debt issue prior to the oil price collapse was the US$ 125 million multiple field projection loan facility arranged for Clyde Petroleum. This facility has been good for both Clyde and the banks as it is based on continually updated cashflow projections for the company's projects and includes consideration of its corporate cashflows.

In August of 1986 we saw the sale of Westar's interests in Brae for US$ 125 million. Many industry players at the time said it was worth half that amount - many now say it is worth double that amount.

November 1986 saw the attempted takeover of IC Gas by Gulf Resources of the U.S. Eventually a standoff was reached and white knights came into this US$ 1,000 million transaction.

November 1986 also was the month for the US$ 8 billion privatisation of British Gas.

In December 1986 ICI and Enterprise agreed a deal whereby ICI swapped assets for a 25% stake in Enterprise.

During early to mid 1987 several Debt and Equity transactions were initiated and as the oil price pushed solidly above the US$ 15 range the financial markets seemed to have returned to a more even and continuous state. European banks did not have the same energy loan problems as their North American counter parts. We are now in the period leading up to the sale of US$ 13 billion sale of the UK Government's 32% stake in BP. The markets, which in our view have adjusted in advance, will accommodate the placement - US$ 60 million has been spent on publicity.

Finally a deal rumoured in the market is the US$ 225 million development for the Emerald Field with:

1. An offtake agreement giving a floor price of around $ 17/bbl, and splitting the upside.
2. Contractors paying for development, and being repaid from cashflow.

Thus oil price risk and reservoir/operating risk are being shifted from the field owners.

E. Conclusions

Although Oil prices have reduced the potential for debt financing (at least as a proportion of development costs) and consequently increased the need for non-debt sources of funds, debt markets are now very robust and would show few signs of jitters even if the spot price drops one or two dollars. The equity markets seem willing to rate the shares of oil companies highly.

Acceptance, by the major financial institutions, of alternative financing models, will no doubt benefit independent oil companies in future years. One would expect to see an increase in the employment of mezzanine finance, convertible or preffered debt, oil price linked instruments and financing packages linked to long term off take contracts.

The capital and asset structure of the industry is also changing motivated by a gravitation towards quality management and a high degree of interesting asset purchases both resulting in consolidation of the independent sector.

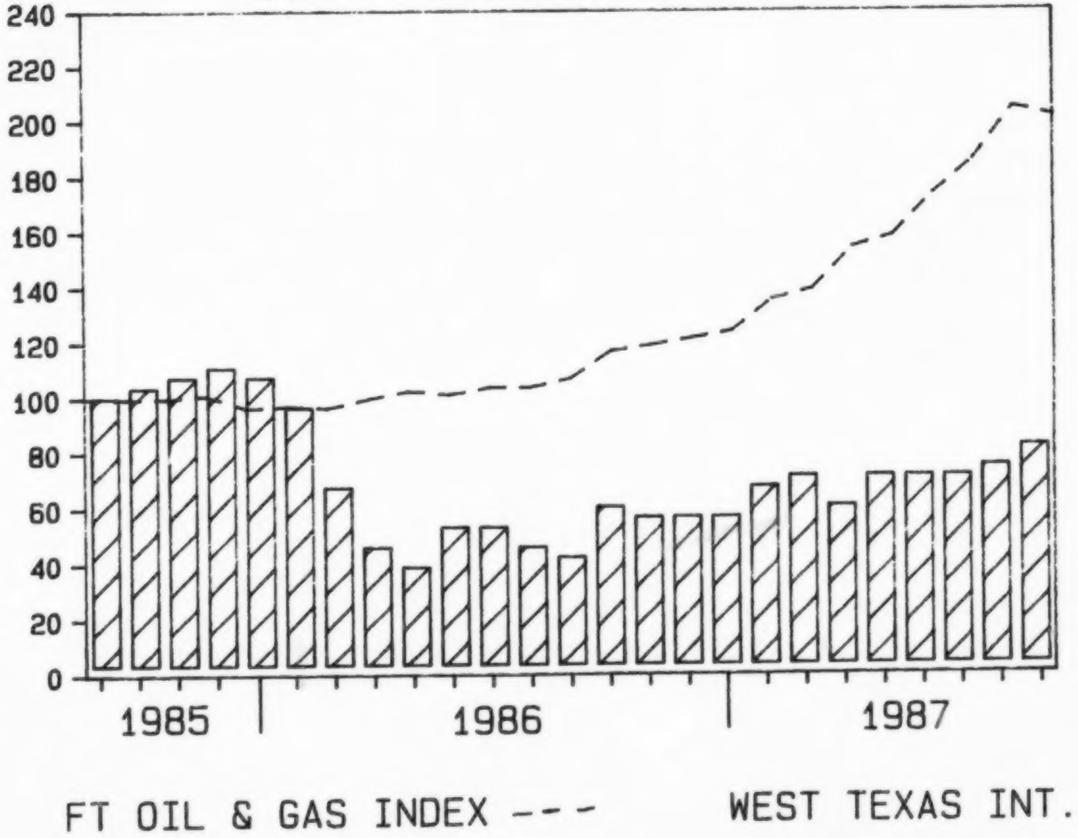
On balance:
We would suggest that companies with international long term oil and gas assets should consider a London listing to maximize shareholders value.

The major European and US companies involved in Europe should have no problem funding exploration and development in the foreseeable future.

Substantial consolidation of Independents is underway with quality entrepeneurial Juniors on the way.

London financial markets will provide substantial support for the oil and gas industry internationally.

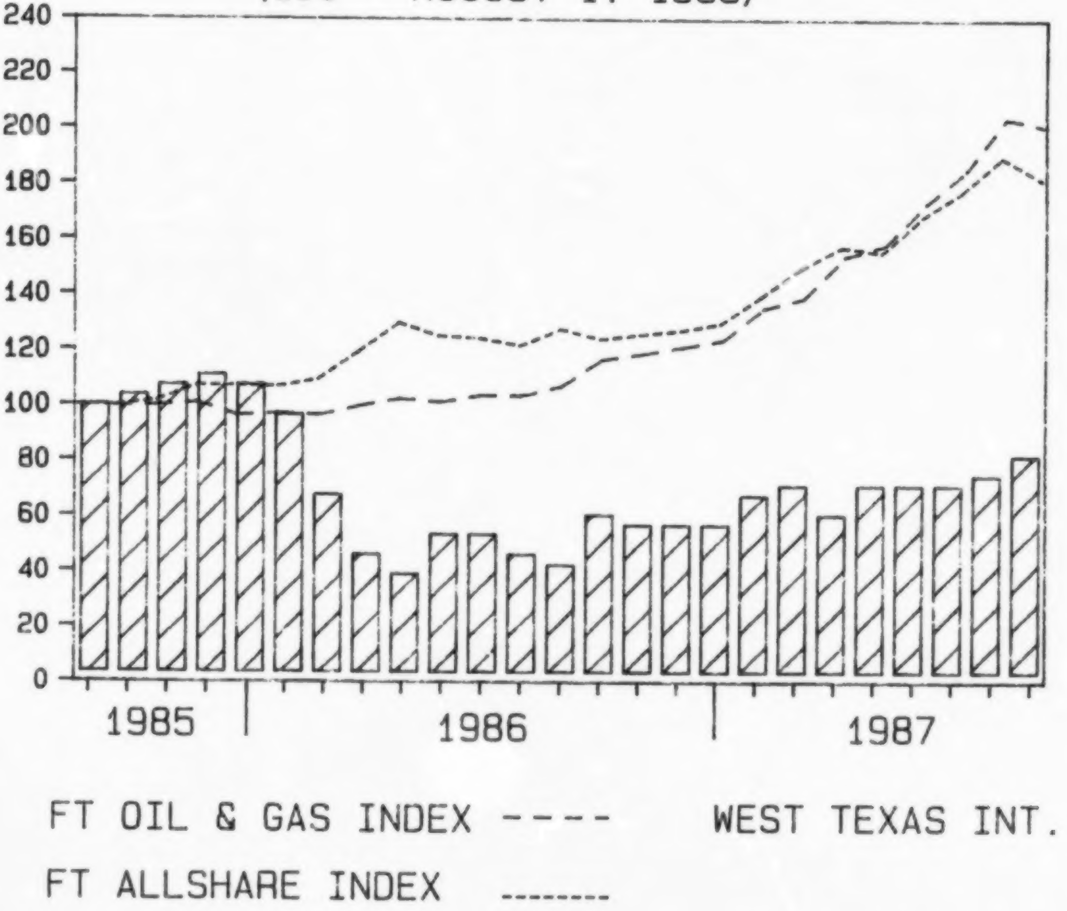
OIL PRICE AND FT OIL & GAS INDICIES
(100 = AUGUST 1. 1985)



September 1987

OIL PRICE AND RELATIVE SHARE PRICE INDICIES

(100 = AUGUST 1. 1985)



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OIL PRICE AND RELATIVE SHARE PRICE INDICIES

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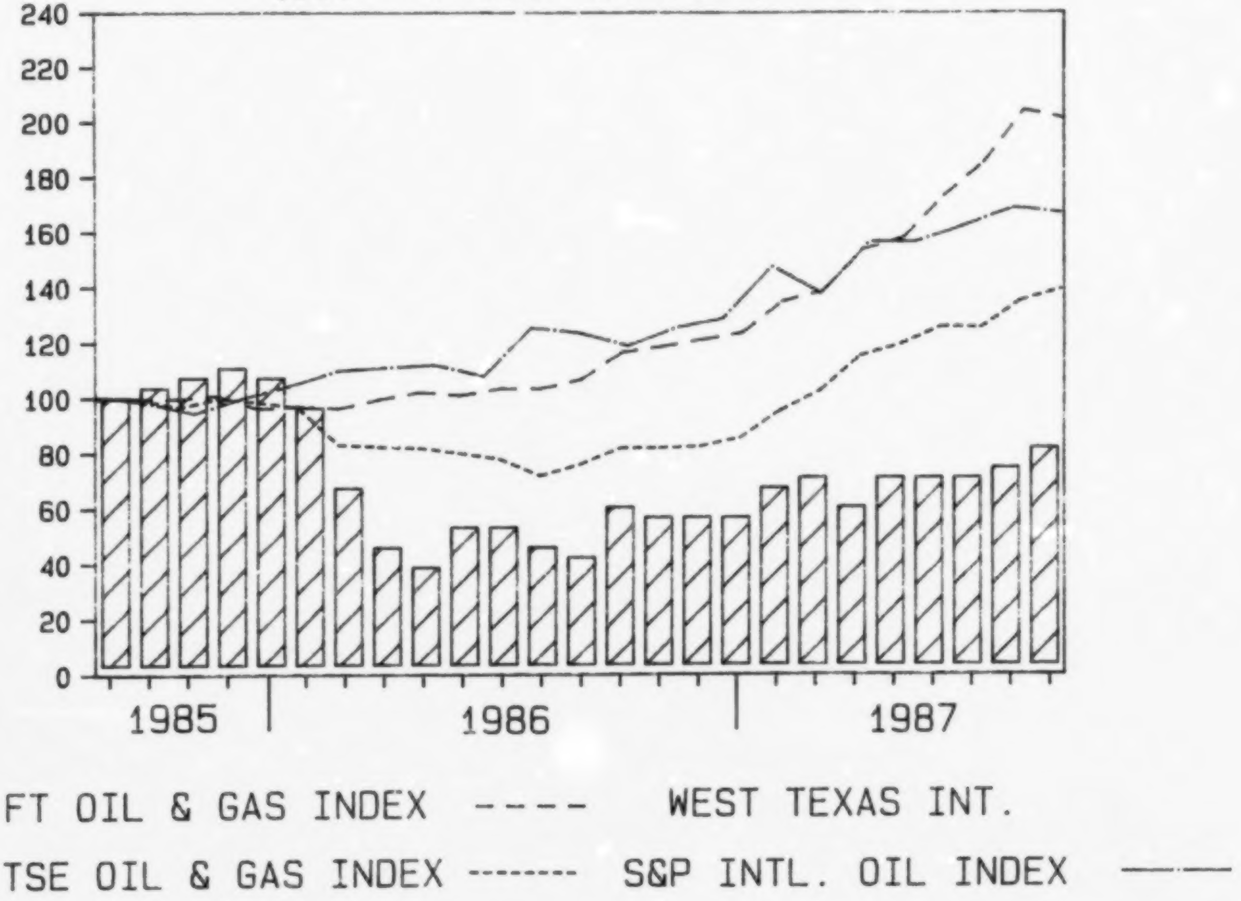

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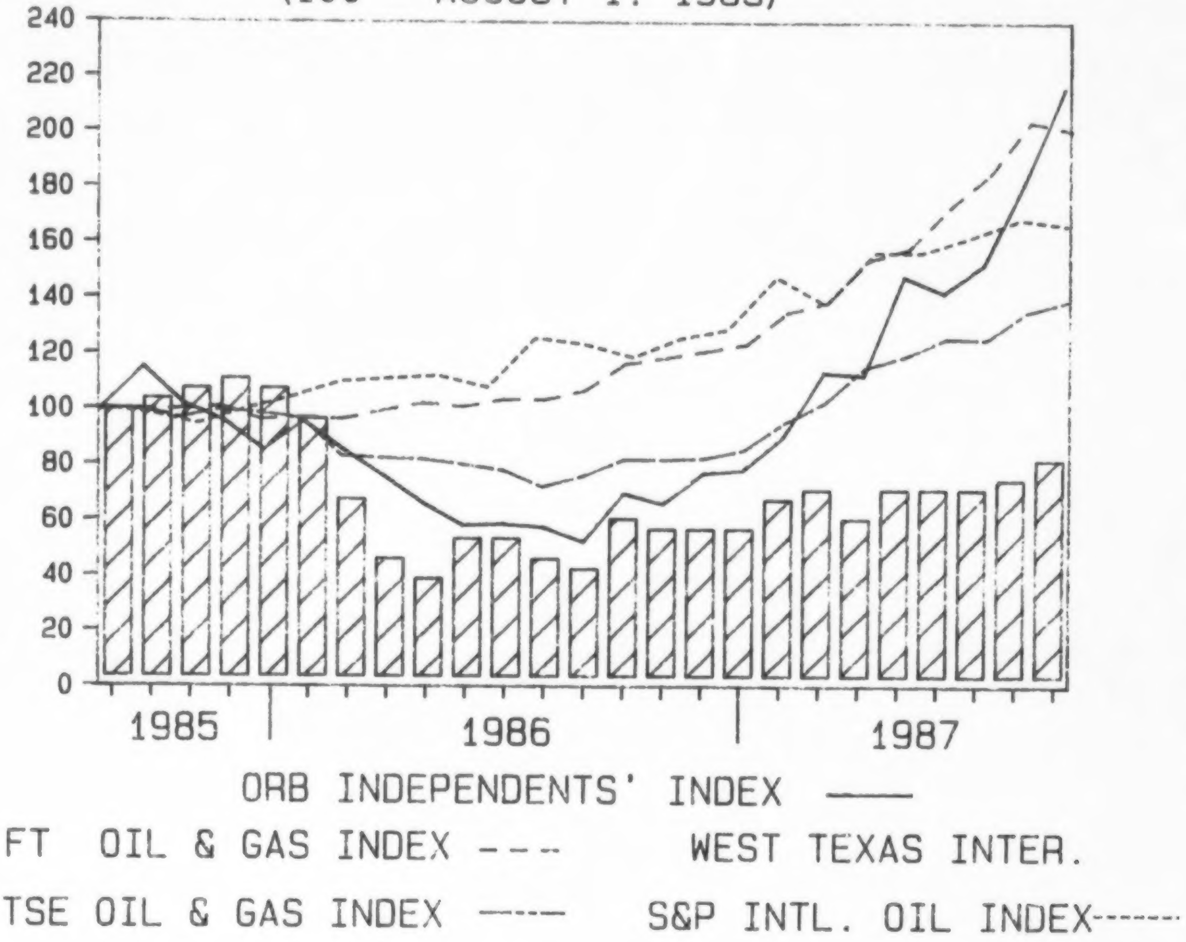
OIL PRICE AND RELATIVE SHARE PRICE INDICIES

(100 = AUGUST 1. 1985)



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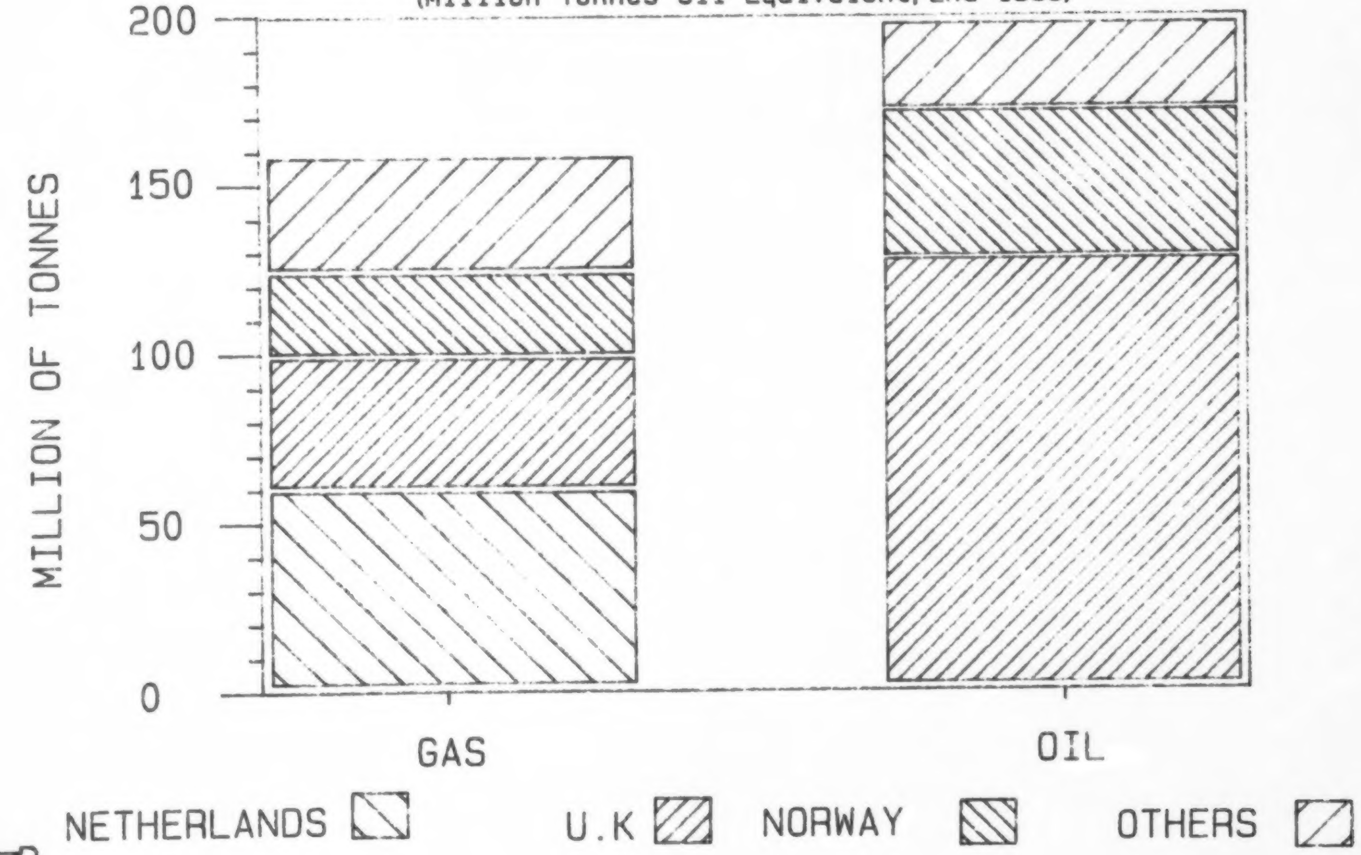
WESTERN EUROPE
OIL & GAS PRODUCTION

(Million Tonnes Oil Equivalent, End 1986)



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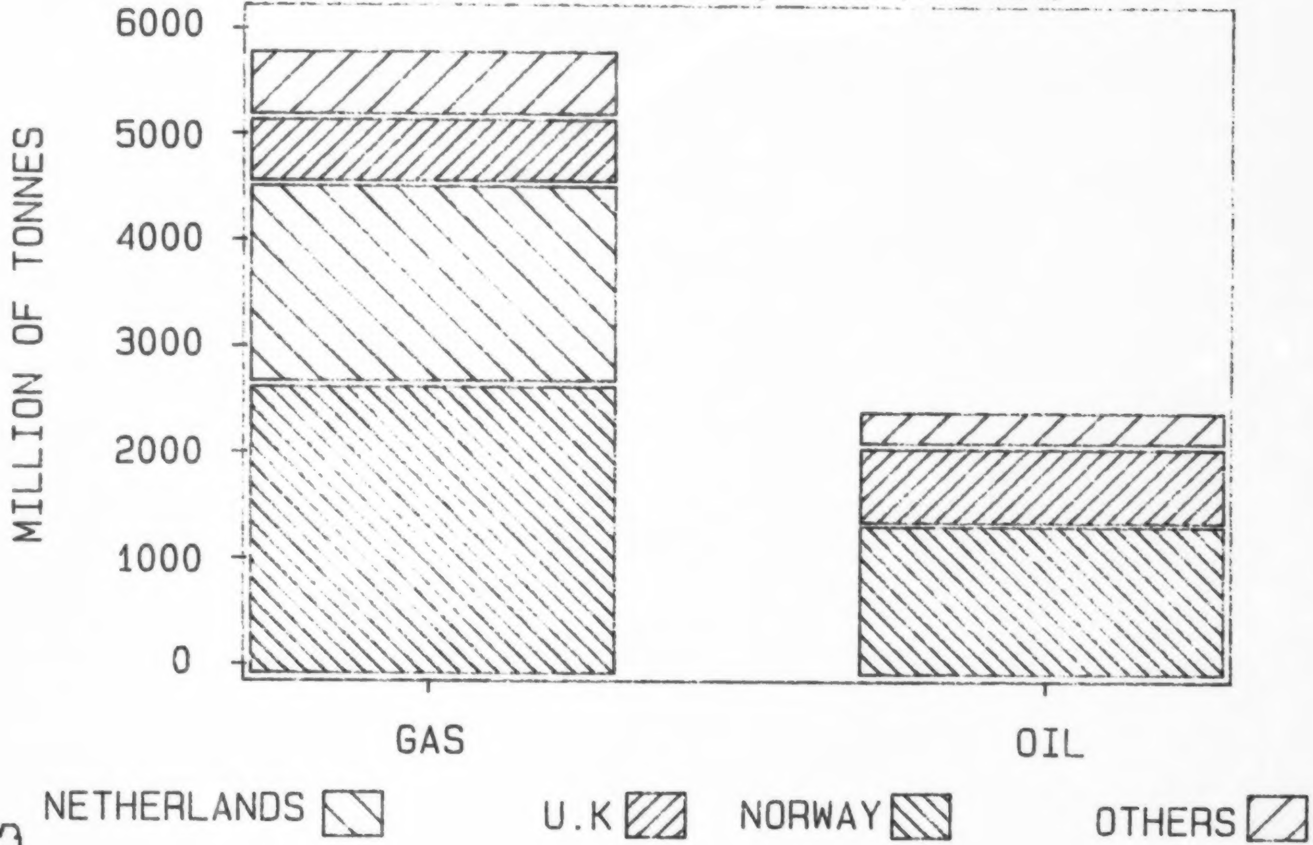
WESTERN EUROPE
OIL & GAS RESERVES

(Million Tonnes Oil Equivalent, End 1986)



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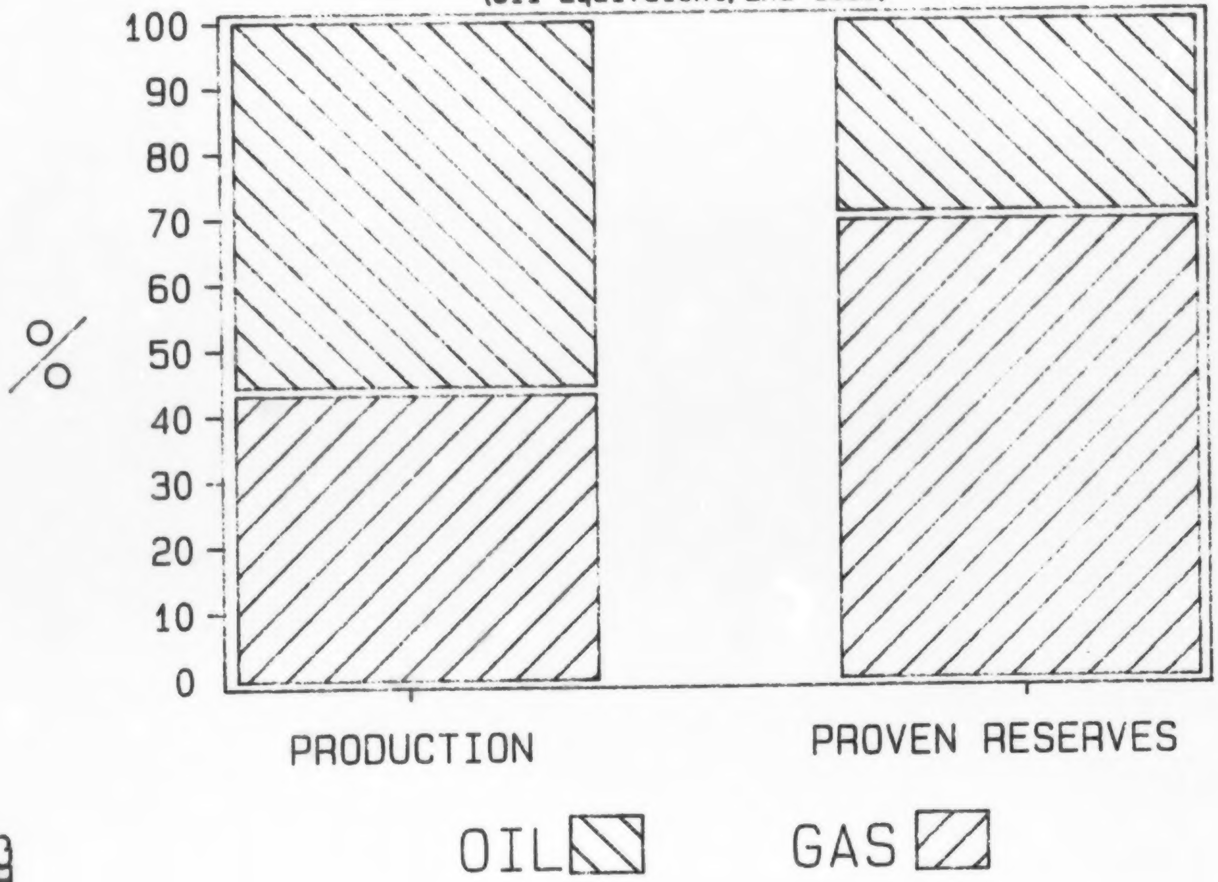
WESTERN EUROPE
OIL & GAS

(Oil Equivalent, End 1986)



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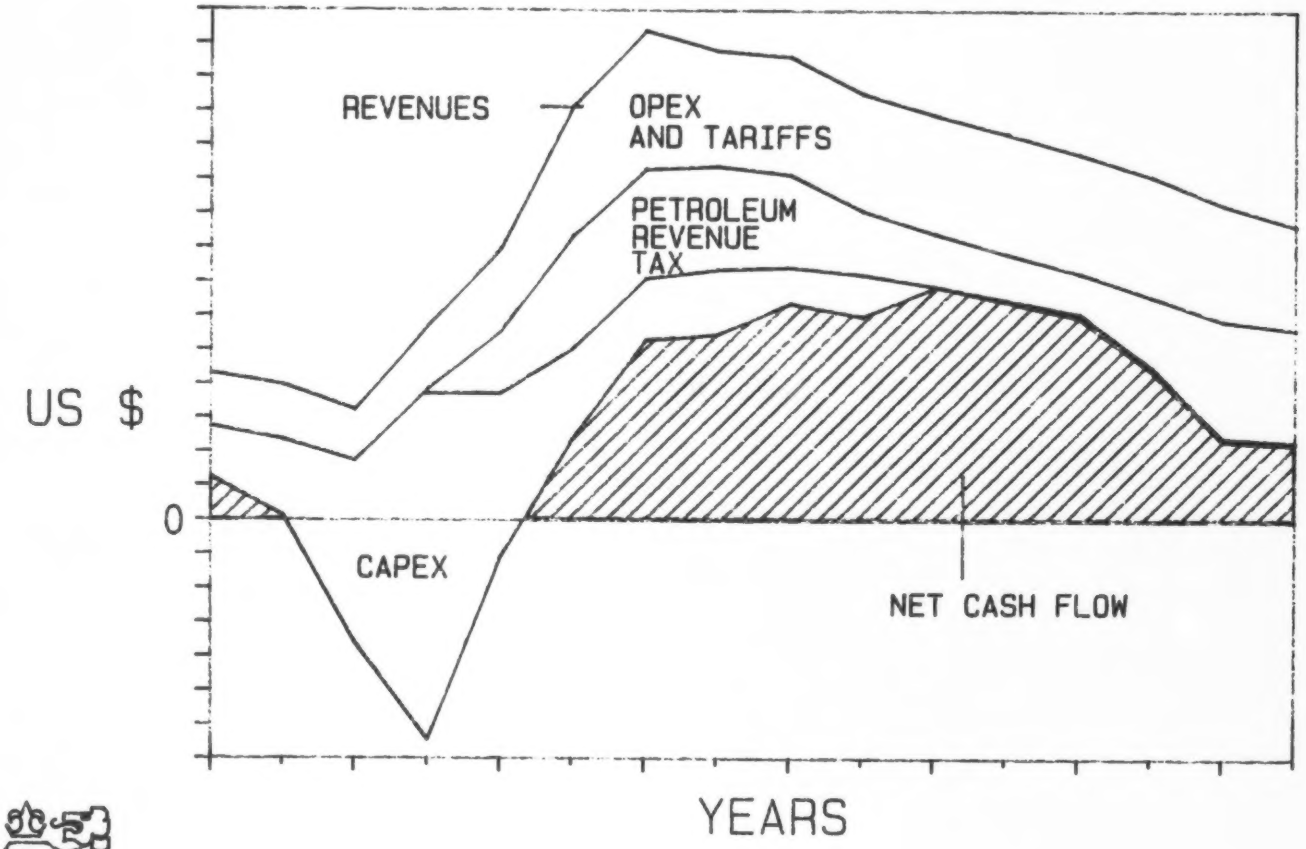
CASH FLOW FORECASTS



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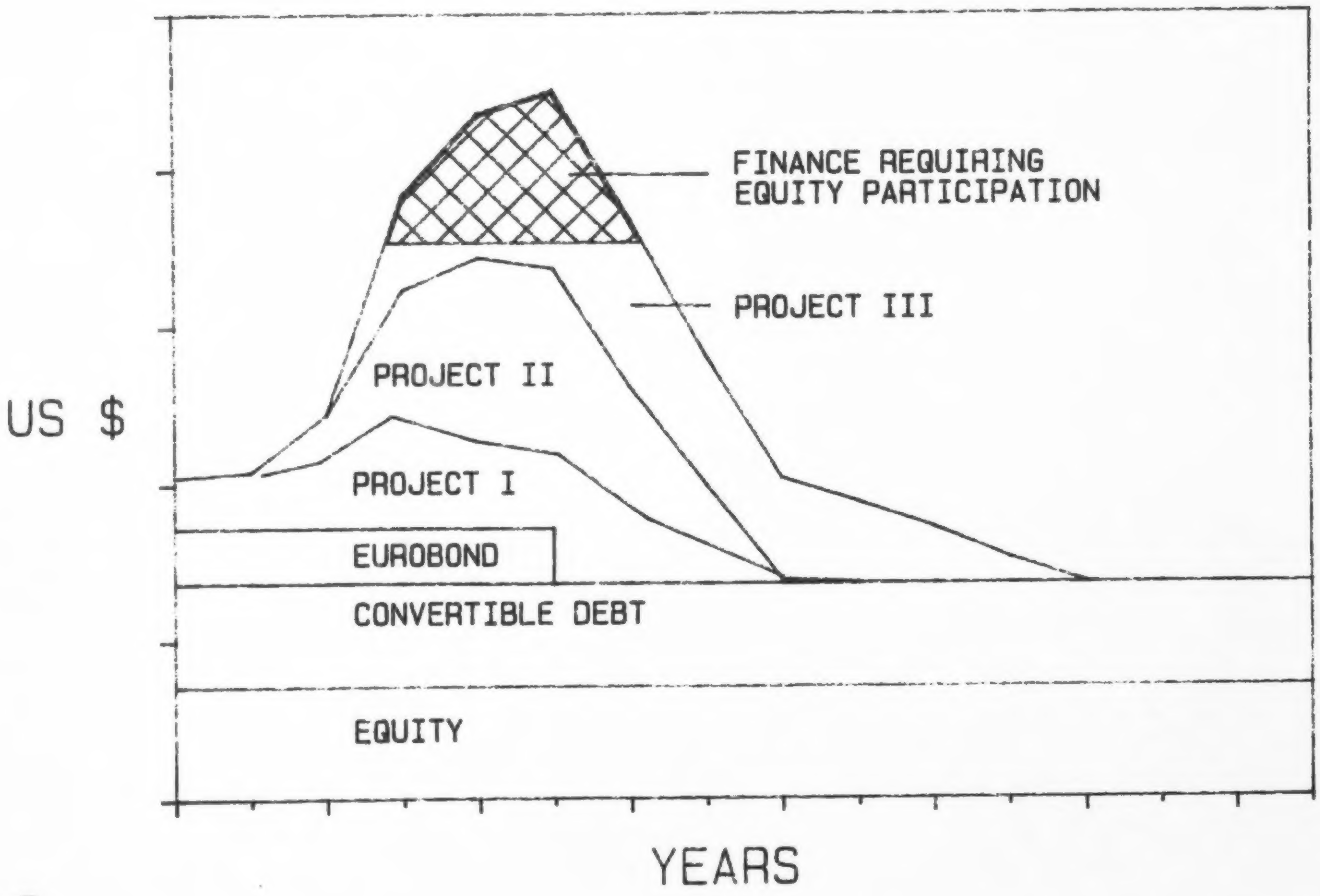
FINANCING REQUIREMENTS



September 1987